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VOLUME 31 NUMBER 17

The Journal

OF THE AMERICAN DENTAL ASSOCIATION

Professional Standards—*Johnson*

Anatomic Amalgam Restorations—*Link*

Complete Denture Impressions—*Boucher*

Dentistry and Clinical Medicine—*Kolmer*

Rampant Dental Caries—*Becks, Jensen and Millarr*

Sodium Perborate and the Mucosa—*Glickman and Bibby*

Sodium Fluoride Mouth Rinse—*Epstein and Schamp*

Fungi and Bacteria Antibiotics—*Fechtner*

Complete Dentures in Twenty-Four Hours

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The Journal of the American Dental Association, Vol. 31, No. 17. Published by the American Dental Association, 222 E. Superior St., Chicago, 11, Ill. Yearly subscription $5.00. Single copy fifty cents. Entered as second-class matter, May 27, 1942, at the postoffice at Chicago, Ill., under the Act of August 24, 1912. Published semimonthly.

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THE JOURNAL
of the
AMERICAN DENTAL ASSOCIATION

Vol. 31 SEPTEMBER 1, 1944 No. 17

INTERRELATIONSHIP OF DENTISTRY AND CLINICAL MEDICINE

JOHN A. KOLMER,* M.D., Philadelphia, Pa.

MANY physicians and dentists appear to be under the impression that the main relationship of oral conditions to clinical medicine is confined to those systemic diseases that may develop secondarily from foci of infection involving the teeth and gingivae. No wonder this is a widespread impression in view of the importance placed on focal infection of these parts in relation to general health by both the medical and the dental profession. But when it is remembered that some diseases of the tongue, buccal mucosa and gingivae are due primarily to disturbances elsewhere in the body and that certain systemic diseases may extend to and involve the mouth, it becomes apparent that the relationship is a much broader one and that not only do dentists require some training and experience in clinical medicine, but also physicians need to know more about stomatology for the proper practice of their professions.

*Professor of medicine in the School of Medicine and the School of Dentistry of Temple University; director of the Research Institute of Cutaneous Medicine.

Read before the dental and medical officers at Ft. Dix, N. J., March 20, 1944.

DENTISTS AND CLINICAL MEDICINE

Certainly it is true that a knowledge of general medicine is required of all physicians specializing in medicine and surgery, and since this is demanded of the ophthalmologist, the radiologist, the otolaryngologist, the obstetrician, the gynecologist, etc., it appears that the practicing dentist should know more about clinical medicine than has hitherto been the case, if he is to be, in all truth, primarily a practitioner of the healing art, specializing in the diagnosis and treatment of the organs of the oral cavity.

Undoubtedly, the purely mechanistic phases of dentistry have, and properly should continue to have, a place of prime importance in the education and practice of dentists, since these alone constitute specialties of great importance in relation to general health. But it appears that these should no more be permitted to engage the sole interests of modern dentists than the purely mech-

anistic phases of x-ray diagnosis and treatment should be the sole interest of the roentgenologist, or operations on the eye, the sole interest and training of the ophthalmologist.

It is true that the dentist is legally restricted to the diagnosis and treatment of conditions under his specialty. But it is likewise true that the more he knows of the relationship of the condition of the teeth and gingivae to general health, and especially the more capable he is in the recognition of those oral lesions that are but local expressions of disease elsewhere in the body, as well as diseases such as those of the skin and specific infection that may extend to the organs of the mouth, the more nearly will he fulfil his prime destiny as a physician specializing in stomatology. Furthermore, such qualifications cannot fail to be ultimately appreciated by the laity and raise to a still higher place of honor in the learned professions both dentists and dentistry.

It is true that the layman does not expect the dentist to treat conditions and diseases beyond the oral cavity; but he has the right to demand and expect that the dentist shall possess sufficient knowledge of clinical medicine to appraise intelligently as well as to advise consultation with the physician when this is necessary. Otherwise, the effectiveness of the dental service rendered, and indeed the very life and well-being of the patient, may be jeopardized.

Furthermore, a knowledge of clinical medicine on the part of the dentist inevitably results in closer cooperation between dentists and physicians in rendering health service on a broader basis, as well as enabling dentists to read medical literature more profitably, to participate in public health work more intelligently and to cooperate more actively in consultations, an ability which at present may be lacking on the part of many dental practitioners.

Mention may also be made of the fact that most persons consult a physician only when they have developed signs or symptoms of a particular disease. Consequently, the physician usually does not see his patients at definite intervals if they consider themselves well. If it is advisable for an individual to consult a dentist twice a year, certainly the heart, lungs, blood, kidneys, etc., should be examined routinely at least once a year.

TABLE 1.—POSSIBLE CHANGES IN THE TEETH DUE TO SYSTEMIC DISEASE

Discoloration due to endocrine disturbances, porphyrinuria or prolonged jaundice (especially in infants and children)
Hematogenous infections of pulps in septicemia
Root resorption in hypothyroidism with osteoporosis
Resorption and hypercementosis in Paget's disease
Odontalgia in tabes dorsalis
Neurility (absence of sensation) in tabes, multiple sclerosis, apoplexy
Pain in upper molars and premolars in maxillary sinusitis
Possible caries and periodontoclasia due to prolonged febrile disease

TABLE 2.—POTENTIAL DENTAL FOCI OF INFECTION

Periodontoclasia, especially in untreated pus pockets
Infected cysts from root-end infection
Teeth with partially vital, but chronically infected pulps
Root-end infections from necrotic pulps and improperly treated and filled pulp canals
Infected retained root tips
Residual infection of tissue after extractions
Impacted or partly erupted teeth that are infected
The so-called "dead tooth"
Generalized gingivitis due to infection, including sordes
Infected radiculodental, dentigerous or multilocular cysts
Salivary calculi with infection
Chronic osteomyelitis of the jaws

Until this has become a more general custom, the dentist is often in position to first detect the signs and symptoms of ill health and to refer persons to physicians for examination and remedial measures.

PHYSICIANS AND DENTISTRY

If this is true, it is well to seriously consider the reverse and provide adequate instruction for medical students and physicians in the fundamentals of dentistry in relation to clinical medicine and public health.[1] This would enable physicians to know more about the simple and basic facts of dental structure and development, to recognize dental defects and disease more frequently, to consult more intelligently with dentists concerning oral disease and to give wiser advice to patients regarding the prevention and treatment of dental diseases and defects than is now generally the case. For example, internists cannot escape a deep interest and responsibility in stomatology. This is true not only in relation to focal infections of dental origin, premature loss of deciduous and permanent teeth and the evils of malocclusion, etc., but likewise by reason of the frequency with which systemic diseases have oral manifestations. The same applies to the pediatrician because of his responsibility in regard to both the deciduous and the permanent dentition, since the fate of both may be influenced by the body metabolism and especially by their environment after eruption. It also applies in the case of the obstetrician, because of the possible ill effects of dental infections on the health of the pregnant woman. Furthermore, since dental disease attacks almost 100 per cent of the population of this country; since it usually begins in childhood and is not self-limiting, and since dental service is necessarily expensive and dental disease so frequently more or less responsible for much ill health, the matter is of vital concern to public health and preventive medicine. It is true that there is no need for the instruction of medical students and physicians in operative dentistry and its mechanistic aspects, just as there is no need for instruction in the operative procedures and special technics of such specialties as ophthalmology, otolaryngology, major surgery and the like; but just as present teaching provides for sufficient instruction in the fundamental principles of these subjects to meet the needs of general practitioners, so should instruction be provided in some of the fundamental principles of dentistry in the interests of individual and public health. In other words, if dentists should be more mindful of oral disease in relation to general health, physicians should be more mindful of the mouth. For this purpose, both require "the prepared mind," based upon didactic and clinical instruction, because none are so blind as those who will not see and understand.

TABLE 3.—DISEASES AND CONDITIONS WHICH ARE DUE OR POSSIBLY DUE TO FOCAL INFECTION OF DENTAL ORIGIN

Diseases	Conditions
Subacute and chronic infectious arthritis	General debility
Rheumatoid arthritis	Loss of weight
Fibromyositis	Fatigue
Bursitis	Excessive drowsiness
Neuritis (sciatica, etc.)	Muscular weakness
Subacute bacterial endocarditis	Acquired hypotension
Keratitis; iritis; uveitis	Headache
Choroiditis; retinitis; possibly glaucoma	Hypochromic normocytic anemia
Glomerulonephritis	Reduced immunologic resistance
Pyelitis; pyelonephritis	
Perinephritic abscess	
Nephrolithiasis	
Cholecystitis; cholelithiasis	
Peptic ulcer	
Erythema nodosum	
Phlebitis	
Some cases of cardiac arrythmia	

COOPERATIVE MANAGEMENT OF FOCAL INFECTION OF DENTAL ORIGIN

Not only may systemic disease possibly produce changes in the erupted teeth (Table 1), but also one of the most important interrelationships between dentistry and clinical medicine is the cooperative management of focal infection of dental origin.

It is not my intention, however, to discuss prevailing views on how or why dental infection may produce disease in other and unrelated organs and tissues in some individuals. Suffice it to state that there are so many potential dental foci of infection (Table 2) that may be not only responsible for general ill health, but also capable of involving many different organs of the body, that the diseases produced concern virtually every speciality in the practice of medicine and surgery.

Nor is it my intention to discuss prevailing views on how dental infection may produce disease in other and unrelated organs and tissues. Certainly it is not necessary to accept or reject focal infection of dental origin as a cause of systemic disease on the basis of selective or elective localization of micro-organisms, as so many believe. Suffice it to state that there is a convincing array of evidence that dental infection *does* cause systemic disease, even though how or why it does in some individuals and not in others is yet a matter of conjecture. It is certain, however, that streptococci and their toxins are by all odds the most frequent producers of focal infection and that dentists should keep these especially in mind in dealing with infected teeth and gums.

Nor am I, as a physician, in a position to offer any advice to dentists on the prophylaxis and treatment of dental infection. I simply see the need for better methods, as it is the physician and not the dentist who is called upon to treat focal infection and who sees altogether too frequently the evils of too purely mechanistic work on the part of dentists.

As a bacteriologist, I recognize the tremendous importance of streptococcic and staphylococcic infection of dental tissues as a cause of systemic disease, even though the presence of the organisms may be but a secondary rather than a primary cause of dental caries and pyor-

TABLE 4.—INFECTIOUS DISEASES WHICH MAY HAVE ORAL MANIFESTATIONS

Bacterial	Spirochetal	Viral
Diphtheria	Syphilis	Common cold
Scarlet fever	Yaws	Herpes simplex
Erysipelas	Gangosa	Herpes zoster
Pertussis	Pinta	Varicella
Pneumonia	Fusospirochetal (Vincent's)	Foot and mouth disease
Typhoid fever	Infectious jaundice	Onyalai (onyalia)*
Chancroid		Influenza
Glanders		Variola
Anthrax		Vaccinia
Gonococcal stomatitis		Rubeola
Keratosis blenorrhagica (gonococcal)		Rubella
Tuberculosis		Dengue
Tuberculids		Yellow fever
Leprosy		

*Etiology not definitely known

rhea alveolaris. On the same basis, I recognize infection of the teeth and surrounding osseous and soft tissues as more important than surface infections of the gingivae. As an immunologist, I recognize that phagocytosis and humoral resistance to infection of non-vital pulps and surrounding osseous tissues are apt to be much less effective than in the case of infection of the soft tissues with their greater vascular supply, which greatly increases the need for more satisfactory methods of disinfection of these structures by dentists, since natural and acquired immunologic resistance is frequently inadequate and may fail.

As a physician, I have long recognized the need for more satisfactory methods of diagnosis and treatment of periapical infections and greatly admire the efforts of the dental profession in these directions. And I believe there is urgent need for better teaching and practice in relation to root-canal therapy, since it is a matter of disinfection not only of the main canal, but also of its accessory branches, with infection of the investing structures.

I well recognize the difficulties encountered in disinfecting an entire tooth structure, but I am hoping that better and better methods will be evolved for providing bacteriologic control for both aerobic and anaerobic organisms. In this connection, I hope to see all dental students sufficiently trained in bacteriology to be able at least to culture all the larger canals in practice before putting in permanent fillings, instead of merely following a routine method which may or may not result in complete disinfection, or trusting to luck that the root

TABLE 5.—INFECTIOUS DISEASES AND INTOXICATION WHICH MAY HAVE ORAL MANIFESTATIONS

Mycotic	Parasitic	Intoxications
Moniliasis	Espundia	Mercurial gingivostomatitis
Actinomycosis	Verruca peruviana	Bismuth gingivostomatitis
Blastomycosis	Trichinosis	Lead gingivostomatitis
Sporotrichosis	Dracontiasis	Silver (argyrosis)
Rhinosporidiosis	Myiasis (screwworm fly)	Arsenic (gingivostomatitis)
	Malaria (herpes simplex)	Thallium (gingivostomatitis)
	Pediculosis corporis (buccal pigmentation)	Phosphorus (necrosis)
		Chromium (gingivitis)
		Gold salts (gingivitis)
		Halogens (mottled enamel)
		Uremia (stomatitis)
		Acetanilid (cyanosis)
		Salicylates (edema)*
		Acetyl salicylic acid*
		Ergoapiol (gingivitis)
		Phenolphthalein (gingivitis)
		Dilantin (gingivitis) and hypertrophy
		Maize smut (gingivitis)
		Antipyrine*
		Barbital compounds*
		Quinine*
		Cincophen
		Hexamethylenamine
		Radium (necrosis)

*Possibly due to natural or acquired allergic sensitization

canal sealing substance employed will do this effectually. After all, a relatively simple and inexpensive bacteriologic equipment and training would suffice, and I hope to see such in the offices of all dentists practicing root-canal therapy in order to minimize the risks of sealing up infected teeth with beautiful fillings which may be perfect from the purely mechanistic viewpoint. I know that this requires a thorough removal of every particle of pulp tissue in the main canal with the best possible choice of ionizable agents for the disinfection of infected tubules, and that this requires more time and patience than many patients have, but the dentist may at least explain the situation and thereby obtain the necessary cooperation on the part of the patient.

Unfortunately, most of our discussions on focal infection of dental origin have referred to the permanent teeth of adults, with too little attention to the deciduous teeth of children. I am afraid that most physicians and dentists have the impression that infected non-vital pulps of these teeth are of little or no importance, as we see so much less evidence of systemic disease from focal dental infection in children. Here is one important field wherein instruction of medical students and physicians by dentists would be very fruitful in showing the influence of pain and restless nights in a failure to masticate properly and of unwillingness to eat in relation to malnutrition and mental retardation. It would show as well the evil effect of premature loss of deciduous teeth upon the forming dental arches and nasal accessory sinuses, with disturbances of the temporomandibular joint resulting in defective hearing; also the deleterious influence of their premature loss upon the development of the permanent teeth, as well as of the alveolar bone, in addition to the evils of malocclusion and possible defective development of the salivary glands.

I am convinced that infection from the non-vital pulps of deciduous teeth may be responsible for some of the diseases of childhood and I hope to see better cooperation between the medical and the dental profession in their management, as well as that of the four

TABLE 6.—BLOOD DYSCRASIA WHICH MAY HAVE ORAL MANIFESTATIONS

Disease	Possible Manifestations
Hypochromic anemia	Pallor of lips, gingivae and buccal mucosa
Plummer-Vinson syndrome	Chronic cheilitis; glossitis; pharyngitis
Pernicious anemia	Glossitis; glossopyrosis
Aplastic anemia	Gingival bleeding
Erythremia	Cyanosis of lips, tongue, etc.
Agranulocytosis	Gingivitis; stomatitis; gingivostomatitis
Leukemia	Gingivitis; bleeding; gingival hyperplasia
Purpura hemorrhagica	Hemorrhage (oozing from gums); purpura of mucosa
Hemophilia	Hemorrhage (spontaneous or after extractions)
Hereditary hemorrhagic telangiectasis	Epistaxis; telangiectases of lips, tongue, gums, etc.

first permanent molars and eight premolars of children. I recognize that the dentist must exercise great care in the treatment of cavities because of the comparatively large area occupied by the pulp in deciduous teeth and the protection that must be afforded the permanent tooth buds against the injury; but I merely mention such matters in passing to indicate that I believe the proper management of deciduous teeth with nonvital pulps to be a matter of considerable importance, including the matter of possible focal infection.

Finally, I fear that some physicians practice to extirpate or drain all possible primary foci of infection with the hope of preventing or retarding further metastases.

In this connection, the matter of extracting infected teeth is frequently one of the utmost importance, since wholesale extractions may so disseminate infection as to result in disaster. I may also mention that I, at least, am among those who favor the administration of carefully prepared autogenous vaccines as part of the follow-up therepeutic program when I am convinced that dental sepsis is wholly or partly responsible.

TABLE 7.—AVITAMINOSES WHICH MAY HAVE ORAL MANIFESTATIONS

Avitaminoses	Possible Manifestations
A	Enamel hypoplasis of unerupted teeth
B_1 (thiamine)	Glossodynia (stomatodynia)
B_2 (riboflavin)	Cheilitis; fissures of commissures; glossitis; dermatitis (seborrheic) of nasolabial folds
P-P (nicotinic acid)	Glossitis of pellagra; spirofusillar gingivitis
C	Gingivostomatitis of scurvy; spirofusillar gingivitis
D	Delayed dentition with enamel hypoplasia and precocious caries
K	Hypoprothrombinemia with hemorrhage

and dentists are skeptical regarding the importance of dental infection in relation to systemic disease because the extraction of infected teeth so frequently fails to relieve the secondary foci. But, in this connection, it should be remembered that when focal infection is chronic, the foci of secondary infection may become so well established as to become independent of the primary foci, so that elimination of the latter may be without appreciable benefit. For this reason, both physician and dentist should be very careful and conservative in expressing a prognosis, although it is generally good for systemic disease. Altogether too frequently, and almost universally, infected teeth are extracted and discarded without bacteriologic examination and thereby the opportunity for securing the organism of primary infection, which is so likely to be a streptococcus, is possibly lost forever. Whenever the dentist has reason to suspect that dental sepsis is responsible for secondary or systemic infection, he should delay operative work until the family physician has been consulted. I cannot always guarantee a cordial reception of any advice that the former may give, but I can guarantee

that the great majority of physicians will welcome just such intelligent and helpful cooperation and that it will inevitably redound to the credit of the dentist on the part of both physician and patient.

DISEASES AND CONDITIONS WHICH ARE DUE OR POSSIBLY DUE TO FOCAL INFECTION OF DENTAL ORIGIN

Some of the diseases and conditions due or possibly due to focal infection of dental origin are listed in Table 3. To these may be added at least some cases of pericarditis, neurocirculatory asthenia, appendicitis, infective asthma with acquired bacterial sensitization, neurasthenia and various psychoses, tinnitus due to fifth nerve involvement, vertigo due to labyrinthitis, otalgia of dental origin and especially the upper third molars, acne vulgaris, furunculosis, etc.

TABLE 8.—ALLERGIES WHICH MAY HAVE ORAL MANIFESTATIONS

Allergens	Possible Manifestations
Procaine	Cheilitis
Iodoform	Gingivitis
Formalin	Stomatitis
Mercurial compounds	Gingivostomatitis
Nickel	Habitual aphthae
Copper	Chronic recurrent aphthae (Mikulicz's disease)
Amalgams	Urticaria
Dentures	Angioneurotic edema
Amidopyrine	Allergic eczema (atopic dermatitis)
Essential oils	Contact dermatitis
Lipsticks	Purpura (drug allergies)
Toothpastes	Agranulocytosis (gingivitis or gingivostomatitis due to amidopyrine, etc.)
Mouth washes	
Sodium perborate	
Foods	
Poison ivy and other plants	
Focal infections	
Physical agents	

When the heart is known to have been damaged by rheumatic fever or to have a congenital defect, it is particularly important to exercise all possible precautions against focal infection in order to reduce the chances of the dreaded subacute bacterial endocarditis from *Streptococcus viridans*, from which there is little or no hope of recovery.

Many patients with chronic organic and functional heart disease are benefited by the removal of dental foci of infection. In all forms of chronic valvular heart disease (rheumatic, hypertensive, syphilitic, etc.), it is particularly important to prevent or remove dental foci of infection as a safeguard against subacute bacterial endocarditis. The same applies to congenital heart disease. In such patients, only one or two teeth with pus pockets should be removed at one time. The administration of sulfadiazine for one day before and two or three days after extractions may afford additional protection against bacterial endocarditis.

In this connection, it is also important to guard against the error of extracting too many abscessed teeth at one time, as this may open so many lymphatic and vascular channels as to increase the risk of bacterial endocarditis. In such cases, the administration to adults of 15 grains of sulfadiazine every eight hours for at least three doses before and six doses after extractions may afford additional protection against the frequently occurring bacteremia.

Patients with the anginal syndrome (angina pectoris) due to coronary artery disease are most in danger from extractions and other surgical procedures because of possible coronary thrombosis due to fear, pain, excitement or anesthesia. Anesthesia is always advisable, as fear and pain may be more dangerous. Skill in the administration of an anesthetic is fully as important as the type of anesthetic employed.

Conduction or local anesthesia induced with procaine is probably to be preferred. In coronary artery disease, it is probably wiser not to use epinephrine. Unless the patient has marked congestive failure, complete heart block or

syphilic aortic regurgitation, anesthesia and operations are usually well borne.

SYSTEMIC DISEASE AND INTOXICATION WITH ORAL MANIFESTATIONS

The important relationship of clinical medicine to dentistry is emphasized even more when we consider that many diseases of the oral cavity are due primarily to disturbances elsewhere in the body. This is true particularly of some types of recurrent gingivitis, stomatitis and gingivostomatitis, so likely to be treated by the dentist as purely local infections, whereas, in truth, at least some of them are due primarily to avitaminoses, endocrine and metabolic disturbances, allergy, disturbances of the hematopoietic organs, general infection or intoxication, etc., with or without secondary and relatively unimportant local infections. It is true that the diagnosis of most of them is based upon manifestations other than in the mouth, but in some the oral lesions may be the only manifestations, as may be true in syphilis, sprue, anthrax and actinomycosis. Needless to state, their exact diagnosis by the dentist may be the first and only means of detection, which both the laity and the medical profession cannot fail to appreciate and which emphasizes the fact that the dentist is or should be primarily a practitioner of the healing art in its broadest and most practical sense. In this category may be placed the following diseases as indicative or at least suggestive of this important relationship of stomatology to clinical medicine:

TABLE 9.—ENDOCRINE AND METABOLIC DISEASES WHICH MAY HAVE ORAL MANIFESTATIONS

Disease or State	Possible Manifestations
Acromegaly	Prognathism; malocclusion, etc.
Cretinism	Delayed dentition and defective eruption; precocious caries; enlarged tongue
Myxedema	Macrocheilia; macroglossia
Osteitis fibrosa cystica (hyperparathyroidism)	Cysts in jaws (decalcification of alveolar processes)
Addison's disease	Pigmentation of oral mucosa
Hyperthyroidism	Cervical decalcification; pigmentation of mucosa (rare)
Diabetes mellitus	Glossitis; gingivitis; cervical caries; odontalgia; decalcification of alveolar processes
Pregnancy	Hypertrophic gingivitis; stomatitis
Menstruation	Gingivitis
Menopause	Chronic diffuse desquamative gingivitis
Schüller-Christian disease	Cystlike defects in jaws; loosening of teeth; gingival papules
Hemochromatosis	Pigmentation of buccal mucosa
Non-tropical sprue	Glossitis
Tropical sprue	Glossitis; stomatitis

1. A surprisingly large number of acute infectious diseases (Tables 4 and 5) embracing the catarrhal stomatitis of measles, scarlet fever, pertussis, etc., sometimes progressing to gangrenous

stomatitis or noma; chancres of the lips, gingivae, tongue and tonsils, as well as the mucous patches of the secondary stage of syphilis; the rare chancroid of the lips and mouth associated with genital lesions; anthrax resembling parenchymatous glossitis; the oral lesions of epidemic stomatitis or foot and mouth disease, etc.

2. Various chronic infectious diseases like the numerous and varied lesions of the tongue (including leukoplakia), as well as of the teeth, hard and soft palates, etc.; chronic acquired and congenital syphilis, including the chronic degeneration of nerve endings in tabes dorsalis; lupus vulgaris, the tuberculous "chancre" and tuberculous ulcer of tuberculosis; the lesions of nodular leprosy as well as those of rhinoscleroma and malaria; the glossitis and aphthae of sprue, gangosa, frambesia tropica (yaws) and leishmaniasis; the gingival and tongue lesions of glanders, as well as actinomycosis of the tongue, gingivae and jaws; thrush and other lesions of blastomycosis and sporotrichosis, as well as the gingival lesions of oral amebiasis, etc.

3. A large number of intoxications (Table 5) and especially those due to drugs, in which the oral manifestations may be due to natural or acquired allergic sensitization, including the gingivostomatitis of metal, metalloid and halogen compounds such as lead, arsenic, silver, phosphorus, bromine and fluorine poisoning, or due to the administration of mercury, bismuth and the organic arsenical compounds in the treatment of syphilis, where oral sepsis greatly reduces tolerance for these compounds.

4. Diseases due to disturbances of the blood and blood-making organs (Table 6) such as chronic recurrent stomatitis of secondary anemia including Mikulicz's disease; the glossitis and gingivostomatitis of pernicious anemia; the gingivostomatitis of leukemia, so likely to be among the first manifestations of these highly mortal diseases; the hemorrhage of purpura, hemophilia and true polycythemia; the severe gingivostomatitis of agranulocytosis with involvement of the fauces, etc.

5. Diseases due to various avitaminoses (Table 7), possibly including caries as the result at least partly of a deficiency in vitamin D, of such importance is the regulation of absorption and the metabolism of the bone-forming elements, calcium and phosphorus; hypertrophic gingivitis of asthenic children; scurvy

TABLE 10.—SKIN DISEASES WHICH MAY HAVE ORAL MANIFESTATIONS

Diseases (Not Uncommon)	Diseases (Rare)
Lichen planus	Scleroma (rhinoscleroma)
Erythema multiforme	Scleroderma
Pemphigus	Dyskeratosis follicularis
Molluscum contagiosum	Dermatomyositis (pseudotrichinosis)
Epidermolysis bullosa	Acanthosis nigricans
Pseudocolloid (Fordyce's disease)	Acrodermatitis perstans
Dermatitis herpetiformis	Multiple hemorrhagic sarcoma
Dermatitis exfoliativa	Mycosis fungoides
Impetigo contagiosa	Lipoidosis
Lupus vulgaris	Xanthoma
Lupus erythematosus	Neurofibromatosis
Psoriasis	Amyloidosis of tongue
Tinea glabrosa (lips)	

due to deficiency in vitamin C; rachitis due to deficiency in vitamin D; pellagra probably due in part at least to deficiency in vitamin B complex (B_2 or G); beriberi and polyneuritis due to deficiency in vitamin B; the glossitis of pellagra, etc.

6. Cheilitis, gingivitis, stomatitis, gingivostomatitis, aphthae, edema, purpura, agranulocytosis, etc., due to natural or acquired allergic sensitization to a surprisingly large number of chemical agents in amalgams, dentures, lipsticks, tooth pastes, mouth washes and occupational substances as well as to foods, anesthetics or impurities contained in them, etc., as shown in Table 8.

7. Diseases due to various endocrine and metabolic disturbances (Table 9), including the stomatitis, gingivitis and glossitis of diabetes mellitus; the gingivitis of menstruation, pregnancy and the menopause as well as, possibly, the epulides of pregnancy, the malformations of the teeth and jaws in acromegaly; the pigmentation of the buccal mucosa in Addison's disease, which may be among its earliest manifestations; the glossitis of tropical and non-tropical sprue, etc.

8. Skin diseases that may involve the lips or oral cavity (Table 10), like the dreaded pemphigus, which indeed for years may appear only about the lips and buccal mucosa; lichen planus, in which about 50 per cent of cases present lesions of the tongue and buccal mucosa; the rare epidermolysis bullosa, in 75 per cent of cases of which lesions occur on the lips, gingivae, tongue, buccal mucosa and palate; erythema multiforme in which about 50 per cent of cases show buccal or labial lesions and which indeed may be confined to these parts; dermatitis herpetiformis with lesions of the cheeks; the common impetigo contagiosa, as well as herpes catarrhalis and herpes zoster with lesions about the lips, tongue and cheeks; lupus erythematosus in which about 10 per cent of cases show extension to the buccal mucosa as well as to the gingivae, tongue and hard palate; scleroderma, in which about 50 per cent of cases show involvement of the tongue as well as the cheeks and such common diseases as eczema, erythema nodosum, urticaria, angioneurotic edema and alopecia areata, sometimes due to focal infection of dental origin. In this category is also to be placed such diseases as acne vulgaris, acne rosacea and furunculosis, sometimes aggravated by oral sepsis, as previously mentioned.

This by no means exhausts the lists of diseases indicative of the close relationship between stomatology and clinical medicine. For example, the dentist should also have some practical knowledge of diseases of the heart and especially in relation to oral surgery and anesthesia; of allergy in general with special reference to hayfever and asthma; of diseases of the gastro-intestinal tract, including those of the liver and gallbladder; of diseases of the kidneys and even of some of those of the nervous system, as well as of psychiatry in its relation to dentistry. But I hope that this review will lend support to the widespread and growing opinion that dentists require some training and experience in certain aspects of clinical medicine and that physicians require some special training and experience in stomatology and at least certain aspects of clinical dentistry.

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COMPLETE DENTURE IMPRESSIONS BASED UPON THE ANATOMY OF THE MOUTH

CARL O. BOUCHER,* D.D.S., Columbus, Ohio

THE objectives of complete denture impressions are: (1) retention, (2) stability, (3) support, (4) esthetic values and (5) preservation of the alveolar ridges. Success in attaining these objectives depends on the dentist's knowledge of the anatomy of the mouth, and his skill in the use of an impression technic to establish the desired relationship between these objectives and the anatomic structure of the mouth.

Retention of a denture is based on its resistance to forces that tend to remove it from the normal close contact with the mucous membrane. It is the most spectacular and probably the least important of the objectives. It is spectacular to pull on an upper denture without its becoming loose. Likewise, it is good showmanship to be unable to dislodge the lower denture by means of an instrument placed against the lower incisor teeth. But these are not functional forces. A denture that would withstand this kind of test might be a failure under functional conditions. Also, it might not meet the other objectives of complete dentures. Overextension or an extremely tight peripheral seal would develop this type of retention. Retention attained by these means would be only temporary. Stability and support would be lost with the destruction of the supporting structures. Esthetic values would be lost and the retention itself would become ineffective when the mouth is open wide or when the jaw is moved from side to side or the tongue is manipulating food in the mouth.

Retention is attained by the forces of adhesion, cohesion and atmospheric pressure and the plastic molding of soft tissues around the polished surfaces of the dentures. Adhesion and cohesion are effective when there is perfect apposition of the impression surface of the denture to the mucous membrane surface. These forces lose their effectiveness if there is any horizontal displacement of the dentures that breaks the continuity of this contact. Atmospheric pressure is effective primarily as a rescue force when extreme dislodging forces are applied to the denture. It depends on a perfect peripheral seal to keep the pressure applied on only one side of the denture. The presence of air on the impression surface would neutralize the pressure of the air against the polished surface. Since each of these forces is directly proportional to the area covered by the dentures, the dentures should be extended to the limits of the oral cavity.

The plastic molding of the soft tissues around the polished surfaces of dentures helps to perfect the peripheral seal. Also it forms a mechanical lock at certain locations on the dentures, provided these surfaces are prepared for it. This lock is developed automatically and without effort by the patient if the impression is built with an understanding of the anatomic possibilities. An example of this lock can be seen at the distobuccal angle of the lower denture, where the suctoral pad in the cheek folds over it.

*Professor of prosthetic dentistry, Ohio State University.

Stability is based on the resistance to horizontal movement of the denture. Retention is lost when the limit of stability is exceeded by forces applied to the denture. Horizontal movement of the denture takes the denture out of contact with the mucous membrane and breaks the peripheral seal. Therefore, it may be said that stability is more important than retention. Stability is necessary to resist the forces of occlusion, both centric and eccentric. It is attained by utilizing the surfaces of the maxilla and mandible that are at or near right angles to the occlusal plane. These surfaces might not be at a favorable angle, and the soft tissue over them might be too soft in many cases for ideal results. It is the dentist's responsibility to know where these areas are and how to make the best use of them.

Support for a denture is based on the resistance to forces at right angles to the occlusal surface of a denture. A favorable supporting structure is one that does not permit an appreciable change of position of the denture under varying pressure. The quality of the support depends on the thickness of the soft tissues over the bone and the way in which the impression materials are carried against them.

The esthetic value, or appearance, of the denture is dependent in no small way on the impressions. The denture borders support the reflection tissues when necessary. The shape of the mouth and the fulness of the lips depend on the proper support of these tissues at the periphery and by the thickness of the labial flange. The effectiveness of the peripheral seal

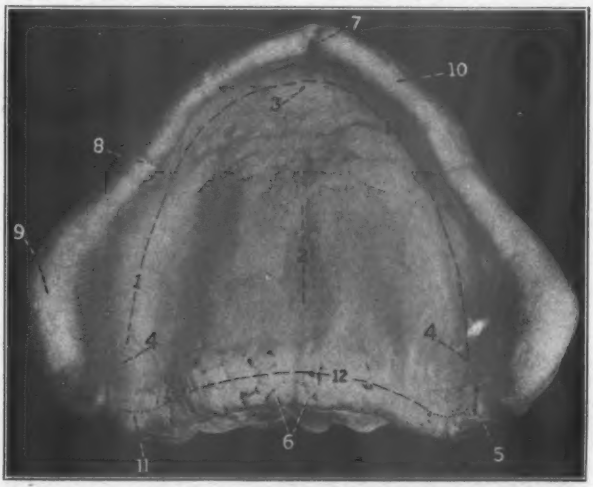

Fig. 1.—Plaster wash impression taken in modeling compound tray. The maxillary groove (1) gives support for the denture and is recorded with the tissue at rest. The median groove (2) and the incisive fossa (3) are to be relieved in the denture to balance pressures and protect the blood and nerve supply. The maxillary tubercular fossa (4), together with areas on the buccal and lingual aspect of the maxillary groove (1), gives lateral stability. The masseter groove (5) provides space for the masseter muscle and ramus in function. The labial notch (7) and buccal notch (8) provide space for the labial and buccal frenula (9). The buccal flange fills the buccal vestibule, attaining maximum tissue coverage, and together with the labial flange (10), pterygomaxillary postdam (11) and the palatal postdam (12), forms a complete peripheral seal. The labial flange 10) is adjusted for thickness to support the lip for improvement of the appearance.

and stability is reduced if the impression is constructed with a labial flange that is too thick. The flange must then be reduced in thickness, the tissues thus being permitted to drop back away from the denture. Overextension of an impression will reduce the amount of vertical opening possible for a case. Then when overextension is corrected, the tissues will not be properly supported and the vertical dimension will be reduced too much.

The preservation of the alveolar ridge is the most important objective of impressions for dentures. The destruction of ridges will carry with it the loss of retention, stability and support of the dentures and will ruin the finest esthetic effect of the restoration. Discomfort and inefficiency will replace the comfort and efficiency that were attained along with the other objectives, when the ridges shrink away. There may be factors other than impressions in this tissue loss, or softening, but improper placement of pressure by an impression can interfere with the blood and nerve supply to the tissues; and will cause its destruction.

The foregoing remarks briefly outline some of the problems involved in developing an impression technic. How these objectives are to be attained will be indicated. (Figs. 1-2.)

Effective adhesion and cohesion can be attained for an upper denture by use of a plaster wash impression, if the wash is taken in a tray that properly supports the plaster. The tray must carry a minimum bulk of plaster into a definite contact with the tissue. Excessive bulk of plaster causes distortion through its expansion. The tray must not contact the tissue as it carries the plaster to position, because this would distort the tissue surface. This distortion would cause injury to the tissue or soreness by

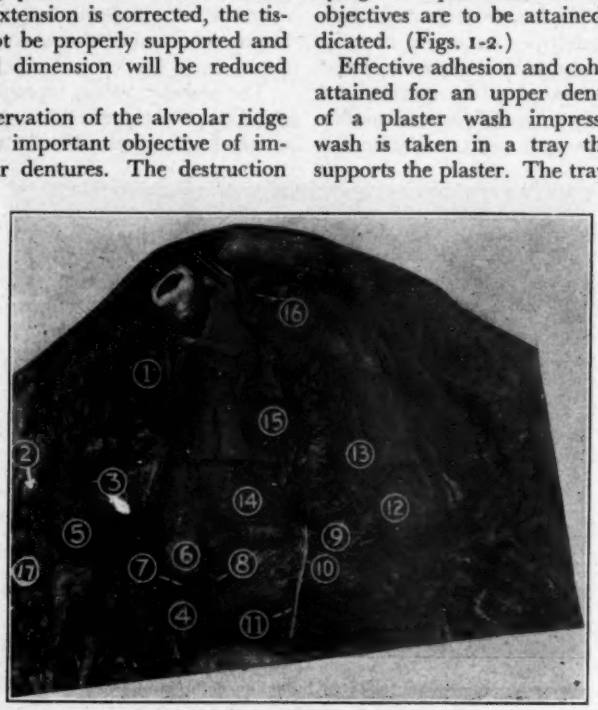

Fig. 2.—Anatomy of upper jaw. For retention, the denture is limited by the labial frenum, labial reflection, buccal frenum (1), buccinator muscle (2), masseter muscle (17), ramus, hamular notch (7) and vibrating line (9). Stability is attained by contact with the buccal and lingual side of the alveolar ridge when the median raphe (15) is relieved. The lip must be supported by the labial flange for the sake of appearance. The blood supply is protected by relief of the incisive foramen (16) and by the thickness of the palatal glands (14) covering the greater palatine foramen (12).

interfering with its blood supply. Moreover, the distorted tissue would tend to resume its normal form, thus exerting a force to dislodge the denture. From this, it can be seen that it is desirable to record the tissue surface in its relaxed form.

A good peripheral seal may be obtained in plaster if it is properly supported by a tray, which must have sufficient width at the periphery to support the plaster and must have sufficient height to carry it to within 1.5 mm. of the reflected tissues, at rest. A larger amount of plaster than this on the periphery will not carry it to certain contact with the peripheral tissues. The flanges of the tray, if too high, will interfere with the tissues as they are muscle trimmed. The structures that limit the extent of the denture, such as the labial frenum, buccal frenum, buccinator and masseter muscles, and the ramus must have freedom for action. The tray must not be too large or too small. The peripheral seal is maintained at the distal border of the denture by means of a postdam. The postdam places a uniform pressure on the soft tissues of the palate in relation to their thickness. It is necessarily located in the hamular notches and just anteriorly from the vibrating line. It is along this line that the tissues will tolerate additional pressures. A postdam located too far anteriorly will be placed on tissues with extreme variation in thickness, and if placed too far posteriorly will be ineffective because it will be in contact with the movable soft palate, which, under certain conditions, will rise up out of contact with it.

Stability is attained in this impression by the definite contact of the buccal and labial flanges with the buccal and labial surfaces of the alveolar ridge; and by the definite contact of the palate with the anterior third of the vault and with the lingual slopes of the alveolar crest.

Fig. 3.—Lower plaster wash impression taken in modeling compound tray, used to record tissue surfaces of stress-bearing areas at rest and to make vulcanite tray. The landmarks are the labial notch (1), buccal notch (2), lingual notch (3), retromolar fossa (4), external oblique groove (5), masseter groove (6) and retromylohyoid eminence (7).

The alveolar ridge is the area which furnishes the primary support for the denture. However, a hard area in the median line, the median raphe, must be relieved to make this effective. This is done by adding metal to the cast before processing the denture. The amount of relief to be given to the cast depends on

the relative hardness of the tissues over the alveolar ridge and over the median raphe. The extent of the relief depends on the size of the hard area.

The esthetic values are preserved by the well-rounded periphery in the anterior portion of the impression and its thickness, which is regulated according to the amount of shrinkage that has occurred and according to the amount of support needed by the lips.

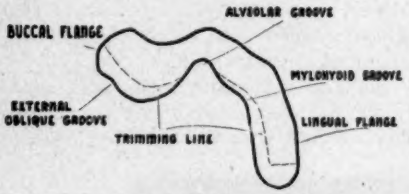

Fig. 4.—Cross-section through final impression. The form of alveolar groove is recorded in plaster. The remainder of the tissue surface is developed in modeling compound.

The health of the ridges is provided for by a minimum amount of pressure applied to the mucous membrane surface of the mouth, by the thin plaster wash. The blood and nerve supply in the anterior third of the palate is protected by extending the relief anteriorly to cover the incisive papilla. The blood and nerve supply to the posterior two-thirds of the palate is adequately protected by the thick palatal glands which cover the greater palatine foramen.

Adhesion, cohesion and atmospheric pressure are all less on the lower denture than on the upper, because of the difference in the area covered by them. Part of the tissues of the lower jaw, within the limits of the functional area, should be covered by the lower denture, to develop the maximum effect of these forces. (Figs. 3-4.)

Adhesion and cohesion in the lower denture are attained by the accurate record of the form of the soft tissues when they are at rest. Their form is recorded by a thin plaster wash impression, taken in a modeling compound tray. The issues of the crest of the ridge are not distorted by a resistant impres-

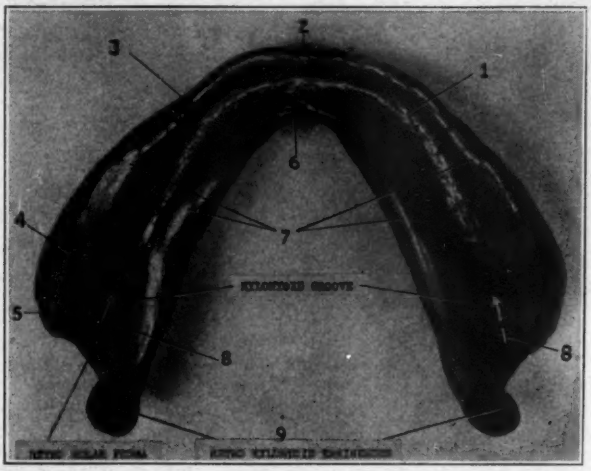

Fig. 5.—Landmarks on final lower impression: alveolar groove (1), which is recorded in plaster, reproduced in vulcanite tray and formed in cast; labial notch (2); buccal notch (3); external oblique groove (4); masseter groove (5); lingual notch (6); retromolar fossa (8), and retromylohyoid eminences (9). The slopes of the alveolar groove and the entire periphery are developed in modeling compound.

sion material. A cast is formed in this impression, and a vulcanite tray is processed over this cast. The bottom of the alveolar groove in the vulcanite tray has the same form as the plaster wash impression. This form is carried through to the completed denture. The periphery of the tray is cut until it is 1 mm. short of the reflected tissues. Also, 0.5 mm. and all undercuts are removed from

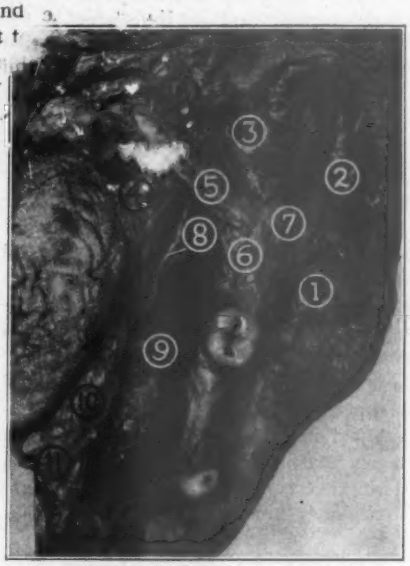

Fig. 6.—Anatomy of lower jaw. For retention, the denture makes continuous contact with structures that limit it: the labial frenum, buccinator muscle (1), masseter muscle (2), anterior border of ramus, temporal tendon (7), retromylohyoid curtain (5) and superior constrictor muscle, which is backed up by internal pterygoid muscle (3), mylohyoid muscle (9) and lingual frenum. The lingual flange lies between the alveolar ridge and the sublingual fold (10), the lingual nerve (8) and the anterior tonsillar pillar (4). The denture must cover the retromolar pad (6). Stability is attained by contact with the slopes of the alveolar ridge. Support is given by the alveolar ridge and the buccal shelf medially from the external oblique line. The appearance is improved by supporting the lip. The health of the ridge is preserved by limiting pressure on the crest of the ridge, placing the heaviest pressure on the buccal shelf.

the slopes of the alveolar groove in the tray.

Modeling compound is added to the cut surfaces of the tray to restore the contact with the slopes of the ridges, and to perfect the peripheral seal. This compound is heated and inserted in the mouth in such a way that the excess will flow over the crest of the ridge and out over the periphery. When it is removed from the mouth, the compound that has moved down into the bottom of the alveolar groove on to the uncut vulcanite is removed. This process is repeated until no compound moves into the bottom of the alveolar groove, and

Fig. 7.—Suctorial pad (indicated by arrow) in cheek, which folds over distal-buccal angle of denture to make perfect peripheral seal, and automatic soft tissue lock on lower denture in that area.

until the junction between the uncut vulcanite and the compound is smooth, with no ledge either way. This restores the form of the slopes of the alveolar groove and controls the amount of pressure upon it. (Figs. 5-6.)

Atmospheric pressure is effective as a retentive force because of the peripheral seal developed by the muscle trimming in modeling compound. The seal is developed as a plastic record of the structures that limit the extent of the impression. These structures are the labial frenum, the reflected labial mucous membrane, the buccal frenum, the buccinator muscle and reflected area of the

cheek, on the labial and buccal aspect; the masseter muscle, the anterior border of the ramus, the pterygomandibular raphe, the superior constrictor of the pharnyx and the retromylohyoid curtain, on the distal aspect; the mylohyoid muscle, the soft tissues in the floor of the mouth and the lingual frenum on the lingual aspect. The controlled plasticity of the modeling compound makes it possible to vary the amount of tension on each of these structures. There are a few areas which require special attention. The masseter muscle and the internal pterygoid muscle are brought into approximation with the impression only when under contraction. Therefore, a downward pressure should be exerted on the impression tray in muscle trimming these areas. The mylohyoid muscle and the tissues supported above it vary greatly in their form and position with different tongue positions. The lingual flange must be extended downward far enough to maintain a continual contact with the floor of the mouth under all conditions. Also, the lingual flange of the denture must slope toward the tongue at such an angle that these structures will be free to move into all positions. The floor of the mouth in the region from bicuspid to bicuspid is relatively closer to the cast of the ridge than it is posteriorly from that point. The lingual flange in this region must maintain a continual contact with the floor of the mouth without limiting the action of the tongue. It must be possible for the patient to protrude the tongue far enough to wet the lips without interference. The suctorial pad in the cheek folds over the distobuccal angle of the denture. (Fig. 7.)

Stability against forces tending to move the denture horizontally is attained by the modeling compound record of the slopes of the alveolar ridge. Modeling compound heated to 135 degrees is less plastic than plaster of Paris. The modeling compound will, therefore, exert a slightly greater pressure on the slope of the ridge than the plaster. This will assure a definite resistance to horizontal forces applied to the denture. The area lingually from the bicuspids is particularly effective in this respect. It is anteriorly from the sharp mylohyoid ridge and therefore can be made to fit the mandible very closely.

The most favorable areas for support of the denture are on the crest of the alveolar ridge and on the buccal shelf. The crest of the ridge is cushioned by soft tissue, which is not displaced or distorted by the impression and which is completely at rest when no pressure is being exerted upon the denture. The buccal shelf, the area between the crest of the ridge and the external oblique line, consists of smooth cortical bone and is covered by the attachment of the buccinator muscle. It is nearly horizontal except at its anterior end. It is one of the most nearly ideal surfaces in the lower jaw that can be used for the support of a denture. The modeling compound record of this form is developed in such a way as to place the heavy masticatory load on this surface. This area carries more of the pressure than does the crest of the alveolar ridge.

The form and thickness of the labial flange of the lower denture affect the appearance in the same way as in the upper.

The conditions that tend to preserve the lower ridge and maintain its health are related to the preceding objectives. The tissues on the crest of the ridge are protected by their automatic relief. The plaster impression that determines their form is taken while they are at rest. The modeling compound on the slopes of the ridges relieves the pressure on the tissues of the crest. The heavier pressure is transmitted first to the buccal shelf, which is ideally situated to resist these forces. The denture is stable and therefore horizontal movement is re-

duced to a minimum. Horizontal movement causes much of the destruction of ridges. The compound on the slope of the ridges is handled in such a way that it cannot cause a gripping of the ridge. It must be heated to a temperature that will cause it to exert more pressure than plaster of Paris, but not enough to form a ledge on the inside of the denture. If this surface is formed in such a way as to cause no ledge to appear on the slope of the denture, the pressure is properly balanced between the crest and the slope. This develops the most favorable protection for the blood and nerve supply to the tissues, and facilitates repair of damage done by the denture.

It is obvious that there are factors other than impressions in successful denture construction. Occlusion, arch form, leverages, tooth color, size and form are a few of the varied problems that affect the retention, stability, support and appearance of the denture, and the preservation of the alveolar ridge. Each step in the construction of complete dentures has its own responsibility for the end-results. Good impressions are necessary to success because all the other problems are dependent on their success for their solution.

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PROFESSIONAL STANDARDS AND HOW THEY ARE ATTAINED

ARLIEN JOHNSON,* Ph.D., Los Angeles, Calif.

"TO UNDERSTAND a man, to ascertain the anatomy of his mind," says a philosopher, "we must, first of all, find out his 'vital springs,' those things which attract his spontaneous attention."[1] Those of us who are fortunate select our vocations in response to these vital springs. They give meaning and significance to life, to earning a living. Indeed, they are the foundation of a profession. It is the common interest in dentistry which brings several hundred people together in this annual meeting of the Los Angeles County Dental Society.

It has been said that the growth of the professions and the influence of professional associations upon public policy is one of the hopeful features of the times. Yet almost any one who is devoted to his profession is dissatisfied with it. He sees how far short it falls of the attainment of professional standards. How, then, can it be that the influence of the professions is a "hopeful feature of the time"? The answer is, I believe, that inherent in the meaning of a profession are certain objective standards or criteria that have social signifiance. No one has a right to call himself professional unless he understands these criteria and is willing to try to practice them alone and in cooperation with his colleagues.

*Dean, Graduate School of Social Work, University of Southern California.

Read at the annual meeting of the Los Angeles County Dental Society, December 10, 1943.

THE MEANING OF A PROFESSION

I propose to discuss professional stand-

ards by offering five hallmarks that any occupation must bear or five criteria that it must meet in order to be called a profession. These criteria are (1) special competence in the performance of a service, (2) education, both general and special, which insures competence, (3) research, which gives a profession the right to be called "learned," (4) a sense of brotherhood or consciousness of bonds between the practitioners that induces formal association or organization, and, finally, (5) motivation in favor of the public interest. Let us consider each of these criteria in some detail.

1. *Special Competence.*—There is little doubt that "special competence, acquired as the result of intellectual training, is the chief distinguishing feature of the professions."[2] Two ideas are involved here. One is that the professional man has a specialized technic not possessed by every one. The other is that he has acquired and practices his technic through intellectual effort. Any one can learn to operate a machine to sink a shaft for an oil well, but it requires an engineer to know where to sink the shaft and how deep to bore for oil. The activity of the engineer is essentially an intellectual one even though he operates a machine or an instrument. The tool is incidental; the real activity is the thinking process. It follows, therefore, that no merely mechanical operation can lay claim to professional status.

The free use of intelligence applied to problems has other implications. If the practitioner must apply his knowledge in understanding, interpreting and selecting his method of attack upon a problem, it follows that he takes upon himself a certain risk and personal responsibility. In spite of training, in the last analysis, he must make a professional judgment as to how best to proceed. This element of personal responsibility lends zest to the task. It allows for creative work and satisfaction that cannot be measured in monetary terms. Therefore, the professional man does not sell his services "by the yard." He does not stop in the midst of an operation because the patient's funds are exhausted. The quality or adequacy of the service he renders is measured by his special competence to serve a patient or client.

2. *Education.*—The second criterion of a profession is that it shall be capable of communication through an orderly and highly specialized educational discipline. The history of the oldest professions reveals that those who acquired special competence desired to pass it on to others. This they first did through apprenticeship training. (It will be readily recalled that the first American born dentist, Josiah Flagg, learned dentistry by assisting a French naval surgeon and trained dentist in relieving the distress of his comrades in the Continental Army.) The next step toward professional education came when practitioners undertook to establish schools; and, finally, as a profession acquired a body of knowledge and skill that rested upon basic sciences, professional education added theoretical to practical training and moved into the university. The integration of the two kinds of knowledge—theoretical and practical—is one of the problems always present in specialized education for any profession. When this stage of development is reached, professional education requires close cooperation between the university and the professional association of practitioners.

The growth of scientific knowledge in all its phases has imposed other tests upon the man who would enter a profession. He must have a liberal education before he undertakes professional preparation. Carr-Saunders and Wilson, who studied the English professions, came to the conclusion that, among the vocations studied, there were few exceptions to the rule that two tests are imposed, the first a test of general education and the second a test of professional com-

petence[3]: "It is not enough in the interests of efficiency that regard should be had only to technical competence. A professional man should be an educated man in the broad sense of the term, if he is to play his proper part in the application of his technique to the needs of society. In the interest of general education it is undesirable that specialist study should begin too early."[4] General education takes on added importance as the professional man is drawn more and more into consultation on providing for community needs. He must be oriented to the current social and economic order. He must understand the dynamics of social change and his place in it.

3. *Research.*—A third criterion of a profession is that it be "learned." We are accustomed to refer to the established professions as learned. What does this mean? Here we are again reminded that the special competence that characterizes a profession is intellectual rather than routine and that it is acquired as the result of prolonged study and training. It follows that research is essential to professional progress. This is an added argument for professional education being a part of a university. Facilities for research in basic sciences as well as in specialized fields are most readily available in the university. Dentists, for example, must have technical skill in order to fill teeth and make dentures, but increasingly they are expected to be specialists in the anatomy, physiology and pathology of teeth and mouth.

Flexner has well stated the relationship of research to professional progress:

> Professions would fall short of attaining intellectuality if they employed mainly or even largely knowledge and experience that is generally accessible—if they drew, that is, only on the usually available sources of information. They need to resort to the laboratory and the seminar for a constantly fresh supply of facts; and it is the steady stream of ideas, emanating from these sources, which keeps professions from degenerating into mere routine, from losing their intellectual and responsible character.[5]

Because of their motivation in the public interest, the professions are cooperative and not competitive, in that they make the results of research generally available. We look askance at the medical man, for example, who wants to patent his discovery. Advancement in the treatment of tuberculosis, anemia, diabetes and many other diseases has depended on research by scientists and physicians who hastened to publish their discoveries. The professional man draws from a common stock of knowledge and feels an obligation to contribute to it. He knows that upon the results of individual and collective efforts in research will rest the future development of his profession.

4. *Professional Associations.*—A powerful influence in the development of a profession is the association of practitioners for the promotion of their common interests. It has been said ". . . a technique may exist and men may practice it, and yet there may be no profession. . . . A profession can only be said to exist when there are bonds between the practitioners, and these bonds can take but one shape—that of formal association."[6]

The history of any profession indicates that certain stages of growth in cooperation can be discerned. The first stage occurs when practitioners develop a self-consciousness about their special competence and desire to be recognized by the public as being distinguished from the incompetent in the field. Along with this pride in competence goes pride in honorable practice. The charlatans and the quacks are a menace to public prestige and honor. Professional associations thus help to assure the public that the group, by prolonged and specialized intellectual training, have acquired a technic which enables them to render a specialized service to the community. The next stage in cooperative activity occurs when professional associations attempt to guaran-

tee to the public that they are responsible for the competence and honor of the practitioners as a whole and to that end, with the help of the state, they impose tests of competence through examinations, and enforce the observance of certain standards of conduct by means of ethical codes. Perhaps the early struggle of law and medicine, for example, to be regarded as vocations "fit for a gentleman" has meaning here. The third stage in cooperative activity is reached when the association begins to examine its own progress in terms of improved education and promotion of research. A fourth stage into which most professions are being pushed at the present time, whether or not they are ready for it, is participation in public activities. This phase will be discussed again when problems in connection with the development of professional standards are considered.

Without doubt, professional associations are the most powerful influence that exists for the advancement of professional progress or for its deterrence. The individual practitioner can make his knowledge and his ideals effective only as he has a sense of being a part of a brotherhood which is organized to speak for the whole membership. In truth, the degree to which practitioners support their professional association and participate in its activities is a measure of the stage of development of the group toward professional standards in their full meaning.

5. *Motivation in the Public Interest.*—The final criterion to be mentioned is that a profession shall serve social ends. The need of the public for a certain service encourages its development, and results eventually in a specialized technic that may be practiced only by those who meet the test imposed by the professional association and the state. This kind of monopoly is necessary for the protection of the public against personal injury and injustice. While many professions prefer to maintain what is described as "private practice," none would admit that its purpose is commercial. With few exceptions, men enter a selected profession first because of anticipated satisfaction in the work to be done and secondly to earn a living. Compensation that is reasonable and a fair return on the time invested in preparation is desired and deserved, of course. Beyond that, the professional man is compensated by satisfying those vital springs of interest that underlie his choice of a profession. A devotion to extending their service in the public interest is an essential hallmark of those who practice a profession.

Professional associations as well as individual practitioners, however, have a responsibility for the use of their profession wherever it can be of service. Carr-Saunders points out that "the advancement of the status and the extension of the craft in the public interest on the whole do go together."[7] Architects, for example, dislike to see buildings "technically inefficient and aesthetically objectionable." They rise in public esteem as they make their influence felt in the planning of housing projects, for example. In this advance, professional and public interest are intertwined. Not only does the profession grow in stature, but it also "raises the ethical standard and widens the social outlook" of those responsible for the guidance of public affairs when it introduces traditional professional attitudes into public activities.

Here, then, we have the criteria for a profession. Arising from needs of people, a service is gradually developed that is characterized by special competence, acquired by education, both general and special; and maintained and advanced by means of research, organized professional associations and a growing awareness of the social significance of the service which the profession exists to render. Let us now turn to a consideration of some of the problems that harass every profession as it develops professional standards.

PROBLEMS IN THE DEVELOPMENT OF PROFESSIONAL STANDARDS

The maintenance of professional standards rests largely upon the profession itself. The phrase "infamous conduct in any professional respect" has been interpreted by the English courts to mean "something . . . which would be reasonably regarded as disgraceful or dishonorable by his professional brethren of good repute and competency."[8] The pressure of tradition and opinion of the "brethren of good repute and competency," therefore, is a potent factor in maintaining standards. The history of dentistry furnishes an excellent example of this. Before 1840, itinerant dental practice was common and quackery was on the increase. Dentistry was a trade that might be learned by apprenticeship, and competition was keen. Improvements in methods of practice, however, brought self-respecting practitioners into the field so that presently they began to protest against these conditions. We are told that, in 1840 "within a period of practically one year, constructive leadership such as had never before appeared among dentists laid the foundations of publications, of organization and intercommunication, and of special education, on which has been based the modern evolution of the dental craft into the dental profession."[9]

Today, we are a century beyond itinerant dentists. Cooperation has gone far to replace competition. By common agreement, overt advertising is considered beneath the dignity of the profession. A code of professional conduct represents the philosophy of the profession and helps to guide the less scrupulous brethren along the narrow path. But a profession cannot dissociate itself from the world in which its practitioners live. In a dynamic, changing world, new problems constantly arise.

One of the problems that every profession faces is how to define or evaluate competence once a practitioner has been admitted to the profession. Free-lance professions like medicine, dentistry and law leave much discretion to the individual practitioner. Is the "best" man the one who charges the most? Who is to judge whether the service is above or below standard? Dentists especially are said to "work behind closed doors." The questionnaire submitted to the membership of the Los Angeles County Dental Society by the program committee indicates a concern with these questions. While the force of professional opinion tends to regulate fees, the practice of overcharging the rich on the plea of undercharging the poor has been an accepted custom in most free-lance professions. As health services for all of the people are made possible by public expenditures, however, this practice of the professional man will not be defensible. The question of the quality of service to be expected should not be answered in terms of the fee paid. Is it possible that dentists are beginning to think of their responsibility in new concepts? To a layman, the appearance in the literature of such phrases as "rendering the mouth functionally sound as a unit," "one fee for one process, that of placing the mouth in order,"[10] "teeth are but instruments of function"[11]—these phrases suggest a new concept of dentistry's responsibility to the patient. In other words, the standards for evaluation of competence change with the times or, more specifically, with advances in knowledge—scientific, social and economic. This throws upon the professional association and upon the professional school the burden of preparing men and women who will be oriented to their profession and to the period in which they are living.

A second problem that appears as a profession develops is the advancement of education to keep pace with or to lead practice. If scientific knowledge grows rapidly, as it sometimes does through a succession of discoveries, the

professional school may lag in adapting its curriculum to the new knowledge available. A rapidly growing profession frequently suffers from lack of a well-prepared faculty. The school must then decide whether to employ practitioners who are weak in theory or persons trained in theory but weak in practical experience. Neither choice is satisfactory. The professional association, in cooperation with the professional school, can do much to improve the quality of the faculty by sharing the responsibility for the choice and recruitment of of the best persons available from the field.

The quality of education is related to resources also. Professional education is expensive education. It cannot and should not be expected to be self-supporting from income from student fees. Practitioners who are good teachers must have salaries large enough to enable them to give full-time to teaching. Funds for the specialized library must be sufficient to insure that a file of historical as well as current materials is supplied. For dental schools, expensive equipment is needed. Finally, a function of the professional school for which finances must be provided is the development of the field of professional work through scholarly research and publication.

Dental education seems to have suffered from inadequate financial support. For this reason, proprietary schools lingered long in some parts of the United States; and although all but five dental schools now have at least an affiliation with a university, two-thirds of them are reported to be self-supporting in the main. Research has been carried on for the most part outside professional schools. If a national foundation would do for dental education what it has done for medical education, some of the present problems that beset the profession would doubtless be mitigated.

A third problem in professional development is described as the "sociopolitical obligations" of the profession. Does a profession have a responsibility for helping to make public policy, especially as it is related to that field of competence? This question might seem to be answered in the affirmative if the statement is accepted that a criterion of a profession's standards is its responsiveness to the public interest. In the long run, there seems little doubt that what is in the public interest is in the interest of the profession. Take, for example, the present situation: within a decade, owing to depression and war, social change in the direction of expanded governmental services for the mass of the population has been greatly accelerated. Public health and medical care will in all likelihood receive federal aid eventually. That this proposal is in line with world trends is evident from the fact that thirty-eight countries have already adopted compulsory or voluntary health insurance in some form; and, during the last thirty-five years, these countries have tended to extend rather than to curtail the benefits of health insurance.[12] The professional groups in these countries, including physicians and dentists, do not advocate the elimination of health insurance although, in most countries, they would like to reform their own status with respect to health insurance administration.

Dentists and physicians in the United States have an unprecedented opportunity to influence their place in the health insurance scheme when it does come; but if they are to do so, they must take the initiative in helping to form public policy. Only in this way will they avoid the pitfalls into which their cousins across the seas have fallen. What an English writer has to say on the professions and public policy seems pertinent:

> The desirability that study activities should form an integral part of the work of any professional association cannot be too strongly emphasized. . . . The most important reason

is that professional men have something to contribute as the result of study which no one else can supply. . . . A professional man has one foot in the academic world and the other in the world of affairs; the academic man knows what is theoretically possible, the professional man knows what is possible in practice, or at least he is in a position to discover what is possible and to make it known. . . . Professional associations thus enter upon public activities, sometimes led by self-regarding motives; but so long as the claims made do not go beyond what is necessary in the way of remuneration, status, and conditions of work in order to make the service efficient, self-regarding activities are not only not incompatible with the public interest but may be said to promote it. . . . The professional associations are centers of initiative and vitality, and it is of the highest importance that they should make advances and not wait until they are invited. Indeed, there is far more to be hoped from the initiative of these organs of society than from the State.[13]

A professional association that does not accept this kind of responsibility is sure to suffer. Examples abound. The pioneer German health insurance law provided that dental diseases were to be treated by dentists, but might be treated by a dental mechanic if a dentist consented. Most of the dentists were located in cities and devoted themselves in the early years of insurance to "luxury practice." The poor and those in the country were treated by dental mechanics. Before long, the technicians were in control of insurance practice, to the chagrin of dentists. To ignore a service for which the public has need is to risk a penalty. American dentists cannot afford to let others make plans for them if dental service is to become an accepted part of public health provision. Too often, in unknown situations, professional associations resist innovations and try to obstruct their development. Instead, they should inform themselves of the trend of the times and make constructive proposals about their part in it. Positive thinking is needed badly today.

HOW PROFESSIONAL STANDARDS ARE ATTAINED

From what has been said about the criteria for a profession and the problems attending its growth and development, it is apparent that the professional association and the professional school in the university are the chief instrumentalities through which professional maturity is reached. Their relationship is reciprocal. Theory and practice advance together. It is of interest in corroboration of this statement that the first national attempt to form a dental society occurred in the same year, 1840, that the first college of dentistry was organized.

In what ways, then, can the professional association work with the university in the advancement of the profession? The first way, and fundamental in progress, is cooperation in studying the status of the profession and in deciding upon measures to improve both education and practice. Dentistry has had at least two studies made which have furnished excellent "blue prints" for next steps in dental education. The Carnegie Foundation Report in 1926 and the Course of Study in Dentistry formulated by a committee of the American Association of Dental Schools in 1935 are as valid in 1943 as when they were made. Dr. Gies' description of dentistry and his conclusion might have been written today instead of seventeen years ago:

> Considered as a whole, the practice of dentistry is, in effect, a combination of the principles of medicine and mechanics, largely on the basis of fine art, applied to the teeth and mouth. Oral health-service, with correlative systemic health-service, are its fundamental purposes; mechanical procedures are its chief ways and means; and artistic oral restorations and substitutions are its aesthetic achievements. Such relationships and duties present the responsibilities of a learned profession, and should rest on a commensurate educational basis.[14]

The Course of Study in Dentistry urged two years of general education as preparation for admission to the dental curriculum. In view of the fact that dentistry is regarded as a part of the public health program, and that public attention has been called to its importance by selective service examinations, dentists have the responsibility of participating in public policy making. General education, in which the foundation for understanding social and economic changes should be laid, is important preparation for such participation. The report of the American Association of Dental Schools has proposed that dental schools include in the curriculum a course on social and economic relations of Dentistry. In the case of dentistry, the factual information is at hand upon which the professional association and the university can plan for improvements in the profession.

Granted that a profession has facts at hand, how is it to utilize them? Here, leadership within the profession is the only answer. Active recruitment of persons who have the educational and personal qualifications for the profession is the responsibility of the professional association quite as much as that of the university. At the same time, the professional group must be willing to see another generation of practitioners coming out of the universities who will be better equipped than they were upon graduation. The professional association can bring constant pressure upon the university to improve its standards. Associations have been known to request courses of study and have even gone so far as to set up teaching posts and scholarships.

Leadership in the university can do much for the profession in the field. It can encourage study groups, offer special refresher courses on latest methods and theory and keep the practitioners in touch with that "fresh supply of facts" which Flexner said should flow in a steady stream from the laboratory and the seminar.

While there are a score of vocations that have been accepted as "professions," many others are emerging and are in various stages of development. Whether in the center or on the periphery of the professions, one fact goes far to determine the degree to which professional standards are well founded. This is the professional spirit which animates the individual practitioners. It is related to those vital springs of interest that lead a man to select a particular vocation, that make him aspire for its improvement, that give him a sense of belonging to a group that is more important than any individual in it. The philosopher describes it thus:

> I cannot conceive of life without a vocation, an inner summons. The vocation arises from the vital spring, and from the vocation is born the project of life which, at every moment, constitutes "my life." The vocation of an individual may coincide with one of those forms of life which have been dubbed with the names of professions. There are individuals who genuinely are painters, politicians, business men, clergymen. There are many more, however, who execute these professions without genuinely being them.[15]

The object of the professional association and of the university is to find those men who are "genuinely" fitted to become members of the profession, and then to give them such stimulation, to inspire and inform them to such a degree that they find "joy in work, eagerness for service and readiness for cooperative enterprise." These men, then, form a profession. Imperfect though it may be because of its constant need to adjust, change and develop in relation to the advances of scientific knowledge and the dynamic, changing society of which it is a part, its practitioners struggle with their problems because of devotion to their common "life." There is no easy road to the attainment of professional standards. Progress toward their realiza-

tion will be measured by the degree of professional spirit in the individual practitioners and by the degree of socialized spirit within the professional association.

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RAMPANT DENTAL CARIES: PREVENTION AND PROGNOSIS

A FIVE YEAR CLINICAL SURVEY

HERMANN BECKS, M.D., D.D.S.; ARTHUR L. JENSEN, D.D.S., and COMPTON B. MILLARR, D.D.S., San Francisco, Calif.

INTRODUCTION

THE prevention and prognosis of rampant dental caries have long been two of the most important and baffling problems confronting the dental and medical professions. In spite of recent developments in the field of preventive dentistry, the concept still prevails that the control* and prevention of dental caries rest entirely with operative procedures. This purely symptomatic treatment of filling cavities is used without consideration of etiologic factors. Consequently, the disease continues to occur, often with increasing frequency. The present war emergency is bringing out with striking emphasis the fact that mechanical means alone are inadequate to meet this problem, especially since the dental manpower of the nation is insufficient to take care of the reparative needs of both the armed forces and the civilian population. It is urgently neces-

From the George Williams Hooper Foundation for Medical Research and the Division of Dental Medicine, College of Dentistry, University of California.

Conducted under grants made by the American Foundation for Dental Science, California State Dental Association and Research Board of the University of California.

*In the past, the term "control of dental caries" has had the misfortune of a wide variety of interpretations. These ranged from the concept that "control" was achieved by repair of affected areas, to the attitude of mind which considered "control" as concerned with the correction of the fundamental etiologic factors. Because of its possible misinterpretation, the term "control" has been avoided in this report.

sary, therefore, to explore the possibilities of prevention.

Several procedures have been suggested in the past. Some had as their main aim the removal of acidogenic micro-organisms from the mouth, which, since the time of W. D. Miller, have been suspected of being responsible for the production of this disease. Most of these procedures have been found to be impractical and disappointingly unsuccessful owing largely to the necessity of waiting for a period of from six months to a year to test the effectiveness of any correction. The many changes that occur during such a long period of time greatly obscure the accuracy of observations. However, the introduction of an immediate quantitative laboratory test by Hadley, Bunting and Delves in 1930[1] provided a mechanism to determine caries activity at any given time by the presence of *Lactobacillus acidophilus*. Its application was first tested by Bunting, Jay *et al.*[2, 3, 4, 5, 6, 7, 8] and confirmed by Becks,[9] Enright, Friesell and Trescher[10] and Thompson.[11]

These preliminary studies offered great possibilities and it became increasingly apparent that this concept should undergo a thorough testing on a sufficient amount of material to determine its validity and practical value. For this purpose, a program was developed in 1937 which had as its objective answers to the following questions:

1. Is *L. acidophilus* consistently present during dental caries activity and absent during caries inactivity?

2. Is the reduction of refined carbohydrate intake effective in reducing the *L. acidophilus* index?

3. Is the reduction of a high *L. acidophilus* index accompanied by a reduction in dental caries frequency?

MATERIAL AND PROCEDURE

The project was divided into two parts:

1. A study of the association of dental caries and *L. acidophilus* indices in two groups: (a) Individuals with rampant dental caries. (b) Individuals who are completely caries-free.

The rampant caries group comprised 1,250 individuals, 572 males and 678 females, who had applied for preventive service during the last five years and ranged in age from 4 to 60 years. Approximately half were 18 years or younger. For purposes of standardization, only individuals who developed ten or more cavities within the preceding year were accepted as having rampant dental caries.

The group completely caries-free was obtained from the student body of the University of California in Berkeley, comprising 265 individuals between the ages of 18 and 54 years, including 170 males and ninety-five females. A preliminary report on some of these individuals has been made by Henningsen[12] and Collins, Jensen and Becks.[13] Their selection was based on clinical and roentgenographic oral examinations. The *L. acidophilus* indices were made for both groups on each of two successive days in order to determine whether a definite relationship exists.

2. A study of the effect of reducing the intake of refined carbohydrates on the *L. acidophilus* index and subsequent caries experience in a large number of individuals with rampant dental caries.

For this purpose, a five-year study was planned and the interval of one year was selected as the basic observation time. When the periods between the dental examinations varied from the one-year standard, the record was allocated to the nearest unit of one year. Through the cooperation of dentists and physicians who referred their most problematic cases, more than a thousand individuals with rampant caries were served in this five-year interval. From these, a total of 790 one-year observations were made, 499 being observed for one year, 111 for two, fifteen for three and six for four years.

Their ages ranged from 4 to 60 years in 272 males and 359 females. Since each one-year observation represents the experience of one individual during that period, for simplification reference will be made to individuals rather than to one-year observations.

In order to recognize and evaluate the activity of dental caries accurately, it was necessary to follow meticulously a standardized plan of examination so that all findings would be comparable. For this purpose, a staff of instructors and clinical assistants were assembled and trained. The standard method adopted included:

1. Clinical and roentgenographic oral examinations.
2. *L. acidophilus* index determination.
3. Evaluation and change in food intake.

In order to familiarize the referring dentist or physician with the procedure, complete sets of instructions were sent on request.*

Clinical and Roentgenographic Oral Examinations.—In order to enable the examiner to compute the caries experience from successive examinations over an extended period of time, it was necessary to establish a systematic procedure of dental examination and an exact system of recording. For this purpose, all filled and unfilled carious areas were charted. The Bodecker Caries Index[14] was used to express the total carious areas involved, and any change found on a subsequent examination was similarly recorded. This readily allowed the observation of primary (new) or secondary caries (new involvement of areas previously restored). For purposes of consistency and accuracy, each case was followed through by a team of examiners. From the standpoint of roentgenographic interpretation, the slightest observable nick or break in the regular contour of the enamel was noted and charted for each area. Even though it was desirable to have an entire denture roentgenogram available, posterior bite-wing films were accepted as the minimum requirement and were retaken once a year. The clinical oral examinations were repeated at least once a year and in many instances semiannually.

L. Acidophilus Index Determinations.—The method employed for the determination of the *L. acidophilus* index was that described by Hadley.[15] Initial saliva specimens were obtained on two successive days, again one week after the change in food intake and monthly thereafter unless lack of response necessitated more frequent checks. These specimens were collected in the morning before breakfast and before brushing the teeth. The patient was instructed to chew vigorously a 1-gm. piece of paraffin 100 times on each side of the mouth and to expectorate all accumulating saliva into a sterile bottle. Mailing containers with detailed instructions, paraffin and sterile bottle were provided. Immediately upon receipt of the specimen, the saliva was plated, and incubated for four days. The colonies were then identified and counted. Routine reports were forwarded to both the referring dentist or physician and the patient.

Evaluation and Change of Food Intake.—For purposes of listing the food taken, a record form was made available to the patient with careful instructions to record food intake for a typical one-week period. Times of unusual activity, such as vacations, trips and holidays, were avoided. Indications of food preferences and dislikes were made, on both the basis of taste and the allergic reaction. Each patient was questioned as to the condition of physical health, recent illnesses or any systemic disturbances of which they were aware. This was done to facilitate collaboration with medical counsel as well as to avoid interference with any recommendations concerning food intake.

*These are available by addressing the Division of Dental Medicine, University of California, Medical Center, San Francisco, Calif.

In evaluating these records, the amounts of refined carbohydrates were estimated and sugars and concentrated sweets were expressed in equivalents of teaspoonfuls of sugar.[13] The totals for the week were then averaged for daily consumption. The value of such records is, of course, open to question for at least the following reasons: 1. Difficulty in securing a record that is a typical sample of food intake. 2. Incomplete recording of kinds and amounts of foods eaten. 3. Variation in sources and preparation of foods affecting the amounts of nutrients. 4. Individual variations in efficiency of digestion, assimilation and utilization.

In the future, quantitative analytic methods of determining the amounts of various nutrients in tissues and body fluids will possibly replace the present rather inadequate methods of assessing the food intake. However, until such methods have been satisfactorily established, it is necessary to resort to evaluations which give at least an index to the trend.

When the patient was first referred, arrangements were made to secure the salivary specimens, a record of the food intake for a period of seven days and entire denture or bite-wing roentgenograms. After an interval of approximately ten days, in which time these data were received and the *L. acidophilus* index determined, the patient was recalled for a detailed oral examination and consultation:

The first recommendations for a change of food intake were based on the number of *L. acidophilus* present and the amounts of refined carbohydrates consumed. In general, this required restriction of the following foods: sugar in and on foods; all concentrated sweets such as jam, jelly, syrup, honey, raisins, dates, figs, prunes, currants and canned fruits, and candy, chewing gum, confections, pastries and sweet beverages. The patient was also counseled to minimize prepared breakfast cereals and other highly refined cereal products. The extent and severity of restrictions were found to be a highly individual matter, in that some patients had to be much more strict than others. In some instances, excesses of fresh fruits had to be curtailed for a time in order to bring about a reduction of the *L. acidophilus* index. To make up for the loss in calories, the patient was advised to increase the intake of other foods; for instance, meat, eggs, vegetables, milk and milk products. In the majority of cases, such a recommendation resulted in an improvement over the previous régime of food intake. In observing the individual patient's response, a check on any fluctuation in body weight was made. Height, weight and age standards, correlated with width measurements at chest and lilac crest, were used.[16, 17] It was noted that there was frequently a loss of from 6 to 8 pounds in the first month or two of this régime, especially in individuals who were overweight at the start. In view of the wide range of variation in individual response, other measures used may be demonstrated in hypothetical cases.

1. The *L. acidophilus* index dropped from high to zero or within a range of from 300 to zero:

The patient was then advised to stay strictly on this régime for the next three months, on the assumption of a favorable prognosis. Additional specimens were taken each month, and if the index remained zero for three months, the patient was allowed one or two servings of a sweet dessert per week. The analysis of subsequent monthly specimens of saliva determined whether this was permissible.

2. The *L. acidophilus* index was reduced to a small fraction of its initial high level.

The patient was encouraged to continue strictly on this régime since, in some instances, the complete change re-

quired a longer period of time. If a zero index was obtained in the next monthly check, the patient was the structed to proceed as under (1). If the index did not drop within the 300 to 0 range, an additional consultation was arranged.

3. The *L. acidophilus* index was reduced only 50 per cent or remained high.

This condition suggested three possibilities: (a) The patient had failed to understand details of the nutritional recommendations and continued to include foods that were favorable to the growth of *L. acidophilus*. (b) The patient did not cooperate through lack of self-discipline or because of an environment incompatible with such change. (c) Certain undisclosed constitutional factors interfered with the normal response.

In such instances, additional consultations were necessary to determine the actual situation.

4. The *L. acidophilus* index fluctuated from high to low intermittently.

In such cases, it was observed that caries was apt to persist, but usually at a much lower rate than previously. Variations in cooperation or other causes were checked at additional interviews.

5. The *L. acidophilus* indices fluctuated from high to 0 intermittently.

Here caries was found to be largely eliminated or reduced to a very low frequency and additional consultations were highly effective.

6. The initial as well as subsequent *L. acidophilus* indices were 0 despite the fact that the dental examination revealed extensive decay.

This indicated the possibility that the cavities present were the result of a previous period of caries activity and that the disease was inactive at the time. For a correct interpretation, these cases required a check on the technic of supplying the specimen. In many instances, the patient had previously been counseled to reduce the intake of sweets. The initial indices, therefore, were actually representative of the effectiveness of corrective procedure.

7. The initial *L. acidophilus* index was 0 and subsequently rose to a high or fluctuating value. This occurred in a very small percentage of cases that presented the same possibilities as examples 3, 4 and 5.

The question arises as to whether the elimination of excessive sweets and other

TABLE 1.—L. ACIDOPHILUS INDEX IN RAMPANT DENTAL CARIES AND CARIES-FREE GROUPS

Groups	Number of Cases	L. Acidophilus Index				
		1	2	3	4	5
		0-299 0	300-999 +	1,000-9,999 ++	10,000-49,999 +++	50,000+ ++++
I. Rampant Dental Caries	1,250	111 8.9%	43 3.4%	232 18.6%	392 31.4%	472 37.7%
Total	1,250	154=12.3%		1,096=87.7%		
II. Caries-Free	265	208 78.5%	10 3.8%	34 12.8%	10 3.8%	3 1.1%
Total	265	218=82.3%		47=17.7%		

refined carbohydrates is permissible from a general health and nutritional point of view. The current emphasis in popular advertising on the energy value of the many products predominantly containing refined carbohydrates must be regarded as distinctly biased. It is recognized that glucose is metabolized in the cell to produce energy with carbon dioxide and water as the final waste products. However, this is not a simple one-step process. There are a number of sequential steps and, for several of these, a specific catalyst must be present. If the catalyst is not available in adequate amounts, the reaction for which it is responsible slows down, the rate of energy production is reduced and the cell is faced with detoxification of waste products other than carbon dioxide and water. Each of these catalysts is in itself a complex organic compound and its presence depends on sufficient amounts of the many necessary nutrients. Thus "energy" depends not only on a generous supply of sources of glucose, but also upon an adequate supply of other nutrients. The body is in no way dependent on refined carbohydrates for the insurance of a smooth and efficient operation of such energy affording mechanisms. Actually, it can operate just as efficiently, if not better, on naturally occurring unrefined sources of glucose, which has the additional virtue of supplying many other nutrients. It might be added that fats, proteins and all other carbohydrates, as well as sugars, are also sources of energy. Thus, the recommendations set forth for dental caries prevention are not only permissible, but also highly desirable from the standpoint of energy, health and nutrition, and are entirely in accord with the summary of the Council on Foods and Nutrition on some nutritional aspects of sugar, candy and sweetened carbonated beverages.[18] Great difficulties were often encountered when therapeutic recommendations were made for an increased intake of these refined carbohydrates. This practice frequently resorted to by internists, pediatricians and obstetricians is regrettable because of the sequence of a state of rampant dental caries.

RESULTS

In discussing the results of this five-year survey, reference is made to the problems stated previously:

1. *Is L. acidophilus consistently present during dental caries activity and absent during caries inactivity?*

In Table 1, it is seen that a total of 1,250 patients with rampant dental caries (Group I) and 265 individuals completely caries-free (Group II) were studied for the presence or absence of *L. acidophilus* in order to explore the significance of the wide numerical range of *L. acidophilus* indices. An arbitrary classification of 0-299 (0), 300-999 (low), 1,000-9,999 (high), 10,000-49,999 (high) and 50,000 (high) and over was used. Since numerical bacteriologic counts are not mathematically exact, the ranges were also expressed as 0, +, ++, +++ and ++++ respectively (Table 1).

The observations on the group of 1,250 patients (Table 1, Group I) revealed the striking picture of a strong relation between high *L. acidophilus* indices and rampant dental caries. In fact, 1,096, or 87.7 per cent, had indices over 1,000, while only 154, or 12.3 per cent, were between 999 and 0.

In contrast to this, of the 265 caries-free individuals (Table 1, Group II), 218, or 82.3 per cent, had indices below 1,000, while the remainder, or 17.7 per cent, were over 1,000. (It is notable that these findings are almost identical with those of smaller caries-active and caries-free groups previously reported.[13]) Many of this caries-free group with high indices, observed for a period of one, two or three years, developed caries in this later period, which indicates that these cases, though

TABLE 2.—L. ACIDOPHILUS INDEX RESPONSE AND DENTAL CARIES EXPERIENCE IN 790 RAMPANT CARIES CASES DURING ONE YEAR FOLLOWING NUTRITIONAL CONSULTATION

Group	L. Acidophilus Index Response	Total		Group Per Cent of Total	1 0 Caries		2 1-2 Cavities		3 3-5 Cavities		4 6-9 Cavities		5 10+ Cavities	
		No.	%*		No.	%‡	No.	%‡	No.	%‡	No.	%‡	No.	%‡
I	(a) High to 0	246	31.1	69.8	219	89.0	21	8.6	4	1.7	2	0.82	0	0
	(b) High to low	120	15.2		68	56.7	37	30.8	12	10.0	3	2.5	0	0
	(c) High to 0, fluctuating	110	13.9		70	63.6	19	17.3	13	11.8	6	5.5	2	1.8
	(d) High to low, fluctuating	76	9.6		27	35.5	24	31.6	17	22.3	7	9.2	1	1.3
II	(a) 0 to 0	44	5.6	14.3	36	81.8	6	13.7	2	4.5	0	0	0	0
	(b) 0 to low	32	4.0		26	81.3	5	15.6	1	3.1	0	0	0	0
	(c) 0 to low, fluctuating	37	4.7		27	72.9	3	8.1	5	13.5	2	5.4	0	0
III	(a) 0 to high	12	1.5	4.0	8	66.7	3	25.0	0	0	0	0	1	8.3
	(b) 0 to high, fluctuating	20	2.5		3	15.0	10	50.0	5	25.0	1	5.0	1	5.0
IV	High to high	93	11.8	11.8	8	8.6	12	12.8	23	24.7	29	31.2	21	22.6
	Total	790			492		140		82		50		26	

*Percentages calculated for the entire group of 790 individuals.
‡Percentages calculated for each of the ten groups.

clinically caries-free at the time of initial observation, were actually caries-active. Their exclusion from the caries-free group would, therefore, improve the already significant figure of 82.3 per cent. Thus, the presence and absence of *L. acidophilus* is indicative of caries activity and inactivity, respectively.

2. *Is nutritional correction with special regard to reduction of refined carbohydrates effective in reducing the L. acidophilus index?*

The answer to question 2 is shown in Tables 2 and 3. In reviewing the records accumulated over the five-year period, considerable variations in *L. acidophilus* response were noted. The 790 individuals were segregated into four groups (Table 2), which showed typical patterns of reaction to nutritional régimes recommended (Table 2).

Group I: The most favorable and typical response was obtained in this group which represents 69.8 per cent of the total, with indices dropping from high to 0 or low (Group I, a, b) and at times showing fluctuations (Group I, c, d). It may be noted that in approximately one-third of all cases (Group I, a), *L. acidophilus* was eliminated completely (0 index) for an entire year. In most instances, the response was abrupt within a few days, following the restriction of refined carbohydrate intake. In addition to this group with the classical response, better than one-third more showed a marked reduction of the index, which reached the 0 or low levels, but was not maintained consistently throughout the year (Group I, b, c, d).

Group II: The initial indices of this group (14.3) were 0, which is atypical for rampant dental caries. Reference is made to the experience shown in Table

TABLE 3.—L. ACIDOPHILUS INDEX RESPONSE IN 438 RAMPANT DENTAL CARIES CASES FOLLOWING NUTRITIONAL ADVICE THROUGH REFERRING DENTIST OR PHYSICIAN

Group	L. Acidophilus Index Response:	Total		Group Per Cent of Total
		Number	Per Cent	
I	(a) High to 0	151	34.5	70.0
	(b) High to low	25	5.7	
	(c) High to 0, fluctuating	83	18.9	
	(d) High to low, fluctuating	48	10.9	
II	(a) 0 to 0	21	4.8	6.9
	(b) 0 to low	6	1.4	
	(c) 0 to low, fluctuating	3	.7	
III	(a) 0 to high	8	1.8	2.0
	(b) 0 to high, fluctuating	1	0.2	
IV	High to high	92	21.0	21.0
	Total	438		

1, Group I. Some of these remained o (Group II a) and others rose to low and fluctuating levels (Group II, b, c). As mentioned previously, many of these initial o indices were due to the fact that the patient had received advice to reduce the refined carbohydrate intake before the first specimens of saliva were taken. Therefore, in the majority of these cases, their initial indices do not represent a state of caries activity, but rather the result of corrective measures. Their reaction for the remainder of the year compared favorably with that of Group I. Thus, by combining these two groups, it can be seen that in 84.1 per cent of all cases, the *L. acidophilus* index was effectively reduced by the reduction of refined carbohydrate intake.

Group III: This group comprised only 4 per cent of the total and, similarly to Group II, started with atypical o indices. During the year of observation, the individuals of Group III responded unfavorably and rose to high and fluctuating levels (Group III, a, b).

Group IV: In contrast to Group I, a, which is classical for a complete response, this group (11.8 per cent) did not evidence any favorable reaction to corrective measures.

The reasons for the lack of response in Groups III and IV were evaluated individually, and repeated interviews showed that the majority of these 125 patients, 15.8 per cent of the total, gave questionable cooperation. (Table 2.)

During the five-year period, *L. acidophilus* indices were made for an additional 438 individuals (Table 3), who received their nutritional advice from the Division of Dental Medicine through their dentist or physician without direct consultation with staff members. The changes in the *L. acidophilus* index of this group were similarly favorable, although a somewhat higher percentage failed completely to respond (Group IV). The other group percentages tally closely with those of Table 2. This shows that such a service can be effectively extended on a broad basis.

TABLE 4.—SUMMARY OF DENTAL CARIES EXPERIENCE FOLLOWING NUTRITIONAL CONSULTATION

Total Number of Rampant Caries Cases	Caries Experience During One-Year Observation Periods									
	0		1-2		3-5		6-9		10+	
790 (Table 2, Groups I to IV)	492	62.3%	140	17.7%	82	10.0%	50	6.3%	26	3.3%
Total	632=80%				158=20%					
665 (Table 2, Groups I and II)	473	71.7%	115	17.3%	54	8.1%	20	3%	3	0.45%
Total	588=88.4%				77=11.6%					

A total of 1,228 individuals thus received recommendations for corrections (Tables 2 and 3) and 1,004, or 81.7 per cent, responded, with a significant reduction in the *L. acidophilus* index.

3. *Is the reduction of a high L. acidophilus index associated with the reduction of dental caries frequency?*

The results of the annual dental examinations were checked against the *L. acidophilus* index response of Groups I to IV of Table 2. Dental caries experience was expressed as 0, 1 to 2, 3 to 5, 6 to 9 and 10 and more cavities per year. As shown

under question 2, Groups I and II responded most favorably in the reduction of *L. acidophilus* indices after curtailment of the intake of refined carbohydrates. A striking parallel is seen in the decrease of dental caries activity for the same groups, as well as the continued caries activity in Groups III and IV with persistently high *L. acidophilus* indices. A summary of the findings in Table 2 is given in Table 4 for the entire 790 individuals (Group I to IV) and separately for the 665 (Groups I and II) which give the affirmative answer to the foregoing question. (Table 4.)

If a preventive procedure aims at complete elimination of dental caries in one year's time, it can be seen from Table 4 that such a result can be achieved to the extent of 62.3 per cent of a group of 790 patients suffering from rampant dental caries, or 71.1 per cent in a selected group of 665 individuals who had a more favorable *L. acidophilus* index response. If, however, the development of only one or two cavities is accepted as a good clinical result for individuals previously having rampant caries (ten or more cavitie in the preceding year), these percentages of prevention rise to 80 per cent and 88.4 per cent respectively.

COMMENT AND CONCLUSIONS

The many theories and concepts of the etiology of dental caries have never been substantiated by clinical investigations of sufficient scope and duration to establish their general acceptance. Probably the greatest advance in the prevention of this disease is due to the earlier writings of Bunting and Jay. Their efforts revived interest in Miller's concept and supplemented it by the introduction of a quantitative bacteriologic test that made it possible to evaluate critically the merits, practicability and effectiveness of corrective procedures.

The present investigation had as its main objectives to determine: the relationship of *L. acidophilus* indices to dental caries activity and inactivity; whether a high *L. acidophilus* index can be effectively influenced by reducing the excessive intake of refined carbohydrates and whether such a reduction would be accompanied by a decrease in caries frequency.

The findings may be summarized as follows:

1. Caries activity and caries inactivity were found to be accompanied by positive and negative indices respectively. In a group of 1,250 rampant caries cases, 1,096, or 87.7 per cent, had *L. acidophilus* indices over 1,000. The reverse picture was found in 265 caries-free individuals, 218, or 82.3 per cent, of whom had *L. acidophilus* indices below 1,000. This contrast between the two groups demonstrates a definite relationship between the presence and absence of *L. acidophilus* in caries activity and inactivity respectively. Although there are other acidogenic micro-organisms which may play a similar rôle, *L. acidophilus* is consistently found whenever a state of rampant caries exists and is absent during caries inactivity. Therefore, the presence of *L. acidophilus* constitutes a significant index and establishes this index as a qualified laboratory indicator for diagnosis and prognosis of this disease.

2. In 1,004 (81.7 per cent) of 1,228 rampant dental caries cases, a reduction of the *L. acidophilus* index was obtained within a period of a few weeks by reducing the intake of refined carbohydrates and replacing the calories derived from these foods by increasing the intake of meat, eggs, vegetables, milk and milk products. The comparatively small remaining group either manifested insufficient cooperation or were influenced by undisclosed factors. This high degree of success established the reduction of the intake of refined carbohydrates as at least one effective means of reducing the *L. acidophilus* index.

3. The reduction of the *L. acidophilus* index resulted in a drastic decrease in

dental caries frequency. In a group of 790 rampant caries cases (ten and more new cavities in the preceding year), the prevention of new cavities was achieved along with the reduction of the *L. acidophilus* index to the extent of 80 per cent. Of these, 62.3 per cent were arrested completely, while an additional 17.7 per cent developed only one or two cavities during the following year. In the 665 cases with a favorable *L. acidophilus* response, no new cavities developed in 71.7 per cent and cavities were limited to one or two in 88.4 per cent. This incidence of favorable response establishes the definite relationship between the reduction of the *L. acidophilus* index and the reduction of dental caries activity.

From the experience gained in the last five years, it has become evident that a program of dental caries prevention based on *L. acidophilus* indices and corrective procedures could be entirely practical and effective in private practice, institutional work and public health service. Even though the introduction of the laboratory procedure in individual private offices may not be economically feasible as yet, the establishment of clinical laboratory facilities in certain centers could make such a service readily available to a large surrounding area. It is encouraging to note that some state health departments already offer this laboratory service. One of the distinct features of this test is that analysis of the sample can be delayed for several days after it is taken, permitting transportation across the country if necessary. The entire procedure wherever applied need not interfere with other routine treatment because it can be accomplished within a few minutes. The effectiveness of correction can be determined within one week, and the time, effort and cost in these preventive procedures are only a fraction of those necessary for repair.

Significant as the reported figures may appear, it must be realized that results will vary with the interest, experience and skill of the individual practitioner, clinical group or public health worker. The reduction in intake of refined carbohydrates may have good clinical results, but it does not explain the cause of the disease.

For instance, occasional observations were made to the effect that some individuals consumed large amounts of sugars without developing decay and others with a low sugar consumption developed rampant dental caries. This suggests that in addition to excessive refined carbohydrate ingestion, other factors have a bearing on the course of this disease. In other words, it is not possible to state that ingestion of refined carbohydrates or sugars or foods containing sugars results in decay. It is, of course, conceivable that the formation of lactic acid is the result of local fermentation of sugars and concentrated sweets. However, the extensive inclusion of these foods may impose a burden on various metabolic processes or accentuate a lack of other nutrients. The establishment of the *L. acidophilus* index as a qualified laboratory test may greatly facilitate further investigation of these unknown factors.

For the successful application of these procedures, dental teachers and students of dentistry must acquire a sound understanding of the fundamentals of nutrition and many other factors in physiologic well-being. The problem of dental caries prevention thus evolves from treatment at the hands of highly skilled technical dental experts alone to include considerations of all factors in a sound dento-medical approach.

The writers wish to express their appreciation to Dr. William G. Donald, university physician and director of Cowell Memorial Hospital, University of California, Berkeley, and the medical and dental staffs for their courtesy and cooperation in the course of these studies.

Appreciation is gratefully expressed to Drs. Jack Bertoglio, Samuel Bleadon, Charlotte Greenhood, Pearle Hannah, Forest Horner,

Carl Norheim, James Pfister, W. B. Ryder, W. S. Smith, Walter Straub, W. W. Wainwright and Don White for their active participation in this program.

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EFFECT OF SODIUM PERBORATE UPON THE GINGIVAL MUCOSA: A CONTROLLED EXPERIMENT

IRVING GLICKMAN,* B.S., D.M.D., and BASIL G. BIBBY,† D.M.D., Ph.D.,
Boston, Mass.

SODIUM perborate is widely used in the care of the mouth and as a specific for Vincent's infection. Clinical reports from different sources describe edema of the lips and necrosis of the lining of the cheeks and lips[1]; tenderness, crimson discoloration and patches of white slough on the oral mucous membrane, and the appearance of a matlike brownish black patch of long hairlike papillae in about the midline of the posterior half of the tongue[2] in persons using sodium perborate as a mouth wash. Spontaneous healing is reported when use of the drug is discontinued.

Two clinical studies have attempted to determine the effects in the oral cavity of continued use of sodium perborate as a dentifrice. In one study,[3] a mixture containing 99.5 per cent sieved sodium perborate mixed with calcium phosphate, coloring and flavor was used as a dentifrice for one minute twice a day for six months. Flavored perborate used under these conditions was not harmful to the oral mucosa and produced no pathologic process on the tongue. In the other clinical study,[4] solutions of 1:500 to 1:25 of sodium perborate in water were used both as a dentifrice and as a mouth wash two to three times a day for extended periods. "Gingival changes to a deeper red" were reported in approximately 7 per cent of the cases and hypertrophied (hyperkeratinized) filiform papillae of the tongue were observed in 21 per cent.

Schroff[5] reports an experiment in which poultices containing varying proportions of sodium perborate were held between the alveolar mucosa and the lip of patients for a period of thirty minutes. Erythema, vesication and sloughing resulted. Following the suggestion of Manchey and Lee,[6] Schroff added from 25 to 45 per cent calcium monophosphate to the perborate poultices to produce a neutralized mixture. Use of these neutralized mixtures caused only a physiologic erythema. "Burns" produced by the use of perborate "actually healed" during the use of a neutralized perborate mouth wash.

This paper reports an animal investigation to determine by correlated clinical and histologic study (a) whether repeated treatment with unflavored sodium perborate, flavored sodium perborate and neutralized sodium perborate ("neutrox") actually caused changes in the gingival mucosa and (b) what the exact nature of these changes is. As a test of the extent to which alkalinity produces these changes, the effect of washing sodium perborate from the gingival mucosa with a neutralizing solution was also investigated.

From the Department of Oral Pathology, Tufts College Dental School. Supported in part by a grant from the Council on Dental Therapeutics.

*Assistant professor of oral pathology, Tufts College Dental School.

†Dean, Tufts College Dental School.

PROCEDURES USED

Because the gingival tissue resembles that of man, five adult mongrel dogs (A-E) were used. (The term gingiva is used here to connote that portion of the oral mucous membrane which extends on the labial aspect from the region of attachment to the tooth to the mucobuccal fold, and on the lingual aspect from the region of attachment to a point approximately corresponding to the length of the tooth root.) The use of males ruled out changes associated with the menstrual cycle. No marked gingival disease was present at the outset, although all animals manifested a slight linear redness and edema at the gingival margin.

Materials.—Pastes were prepared containing 4.5 parts by weight of a concentrated glucose syrup and one part of each of the following: unflavored sodium perborate, flavored sodium perborate and neutralized sodium perborate. A control paste containing precipitated calcium carbonate instead of a treatment drug, and a sodium hydroxide paste made by adding concentrated sodium hydroxide to the concentrated glucose syrup until a mixture with a pH of approximately 10 was obtained, were also used. A solution with a pH of 3.1 for use as a wash after treatment was made by dissolving 1 gm. of calcium metaphosphate ($Ca[H_2PO_4]. 2H_2O$) in 100 cc. of water.

Method.—Cotton rolls covered with a thick layer of prepared paste were held in apposition with the gingival mucosa in the region midway between the mucobuccal fold and the gingival margin for a period of five minutes in animals A, B, C and D and three minutes in animal E. Immediately after treatment, the areas were flooded and gently washed with either water or the acid solution of calcium metaphosphate. Drinking water was available at all times. A commercial canned dog-food mixture containing vitamin supplements was the constant diet. There was no evidence of impaired health throughout the experiment.

Treatments were arranged as shown in Table 1.

The treatments were arranged in this way to bring out the following points:

TABLE 1.—TREATMENTS

Treatment	Unflavored Sodium Perborate		Flavored Sodium Perborate	"Neutrox"	Sodium Hydroxide
Wash	Water	Acid	Water	Water	Water
Quadrant treated in various dogs	Dog A Ul* Dog B Ur	Dog B Ul Dog C Ur	Dog B Ll Dog C Ul Dog D Lr	Dog A Lr Dog D Ul	Dog A Ll
	Dog E †Ul			Dog E† La	Dog E †Ur

*U, upper; L, lower; l, left; r, right; a, anterior.
†Dog E—No wash used.

Dog A: A comparison of the effects of unflavored sodium perborate, flavored sodium perborate, "neutrox" and sodium hydroxide pastes upon the gingival mucosa when each application was followed by a water wash.

Dogs B and C: To observe whether changing from water to acid wash in the same animal would alter the effect of unflavored sodium perborate upon the gingival mucosa.

Dog D: A comparison of the effects of "neutrox" and flavored sodium perborate.

Dog E: A comparison of the effects of "neutrox," unflavored sodium perborate and sodium hydroxide pastes on the gingival mucosa.

There was a variation in the response of the different dogs to all of the experimental pastes in the following order of increasing severity; dog B, dog A, dog C, dog D. (Since treatment of only three minutes' duration was used in dog E instead of the routine five minutes, this animal is not included in this comparison.)

Dog A: The observations in dog A indicate that the use of unflavored and flavored sodium perborate washed with water, "neutrox" washed with water and sodium hydroxide paste washed with water each resulted in erythema, edema, ulceration and sloughing of the gingival mucosa. The ulceration resulting from unflavored sodium perborate healed after cessation of the treatment. The animal was killed before treatment with the other drugs was discontinued.

Fig. 1 (Dog A).—Unflavored sodium perborate, wash water. Right, elevated superficially ulcerated zone to which paste adhered; left, elevated bleb surrounded by areolar erythema. The dark patch indicates normal pigmentation.

Dog B: In the upper left quadrant where unflavored sodium perborate was washed with acid, the severest change observed was a slightly elevated bleb. At no time was the continuity of the surface broken. This lesion healed with cessation of treatment. In the upper right quadrant where unflavored sodium perborate was washed with water, the lesion produced was similar in appearance to that which resulted in the upper left quadrant where an acid wash was used. It appears, therefore, that this animal did not respond so decidedly to the use of unflavored sodium perborate as did dog A, even when a water wash was used. Consequently, the fact that no ulceration resulted when an acid wash was used could not be attributed to the neutralizing effect of the acid, but rather to a constitutional difference in animals A and B. Healing occurred in both the upper left and upper right quadrants after treatment was discontinued. In the lower left quadrant, a lesion with a depressed center covered by a slightly friable gray pseudomembrane and surrounded by a markedly red elevated border resulted after ten treatments with

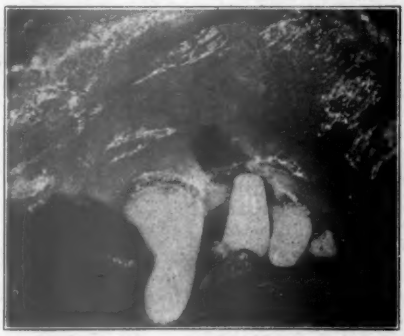

Fig. 2 (Dog A).—Same region as in Figure 1 after seventeen hours without treatment. The lesions appear as discrete elevations, the surfaces of which are covered with pale, friable débris. Dark patch indicates normal pigmentation.

flavored sodium perborate washed with water. This lesion was more severe than the bleblike elevations observed in the upper quadrants, but was not so severe as the lesion which resulted from five applications of unflavored sodium perborate washed with water in dog A.

Dog C: Ulceration and sloughing of the gingival mucosa resulted from applications of flavored sodium perborate washed with water. Healing resulted with cessation of treatment. In the up-

TABLE 2.—OBSERVATIONS

Quadrant	Treatment	Wash	Observations
Dog A			
Upper Left	Unflavored sodium perborate	Water	Erythema (1) [2]; *edema (3) [2]; bleb with surface ulceration (5) [3] (Fig. 1); elevated lesion covered with friable débris after 17 hours without treatment (Fig. 2); elevated crater with hemorrhagic surface (13) [11]; firm elevation with intact mucosa after 3 days, 15 hours without treatment
Upper Right	Control Paste	Water	Slight erythema, no edema or ulceration (1) [1]; disappeared in 1½ hours; no cumulative effect from repeated applications (37) [24]
Lower Right	Neutrox	Water	Erythema (1) [1]; edema and ulceration (4) [2]; sloughing (10) [5]; ulceration surrounded by erythema (13) [6]
Lower Left	Sodium hydroxide Paste	Water	Gray depressed area surrounded by erythema (2) [2]; sloughing, denudation and exposure of hemorrhagic surface (3) [2]
Dog B			
Upper Left	Unflavored sodium perborate	Acid	Erythema (1) [1]; bleb surrounded by erythema (4) [2]; (17) [11]; returned to normal after 3 days without treatment
	Control paste	Water	No marked change from normal (8) [3]
	Unflavored sodium perborate	Water	Moderate erythema (8) [5]
Upper Right	Control paste	Acid	Slight erythema, no edema or ulceration (1) [1]; disappeared in 1½ hours; no cumulative effect from repeated applications (17) [11]
	Unflavored sodium perborate	Water	Bleb covered with gray pseudomembrane (6) [3], (15) [6]
Lower Left	Flavored sodium perborate	Water	Erythema (1) [1]; smooth gray patch surrounded by erythema (6) [3]; ulcer covered by gray friable pseudomembrane (10) [7] (Fig. 3)
Upper Left	Flavored sodium perborate	Water	Erythema (1) [1]; gray slough (5) [3], which changed to elliptical elevation covered by friable débris; exposure of hemorrhagic lesion surface (7) [5]; lesion changed to firm elevation with intact mucosa after 2 days without treatment
	Control paste	Acid	No marked change from normal (15) [8]
Upper Right	Control paste	Water	Slight erythema, no edema or ulceration (1) [1]; disappeared in 1½ hours; no cumulative effect from repeated applications (18) [12]
	Unflavored sodium perborate	Acid	Erythema (1) [1]; bleb covered with friable pseudomembrane (3) [2]; sloughing of lesion surface exposing underlying hemorrhage (12) [15]
Dog D			
Upper Left	Neutrox	Water	Erythema (1) [1]; two depressed lesions with pinpoint hemorrhagic surfaces (4) [2]; lesions coalesced into one (5) [3]; fragmented pseudomembrane covering lesion with intervening hemorrhagic spots (11) [6]
Upper Right	Control paste	Water	Same as control paste, upper right quadrant, dog C.
Lower Right	Flavored sodium perborate	Water	Erythema (1) [1]; elevated lesion covered with gray pseudomembrane (2) [1]; ulcer covered with friable pseudomembrane (4) [2]; sloughing of lesion surface and exposure of underlying hemorrhage (9) [4]

*Number of treatments in parenthesis; duration of treatment in days in brackets

Dog E			
Quadrant	Treatment	Wash	
Upper Left	Unflavored sodium perborate	None	Pronounced erythema (10) [4]
Lower Anterior	Neutrox	None	Pronounced erythema (12) [6]
Upper Right	Sodium hydroxide paste	None	Erythema, elevated lesion with depressed pinpoint hemorrhagic surface (3) [1]; denudation of lesion exposing underlying hemorrhage; generalized edema and gray sheen (15) [2]

per right quadrant, marked ulceration and sloughing resulted after five treatments with unflavored sodium perborate washed with acid. In this animal, it was demonstrated more strikingly than in animal B that washing with an acid wash immediately after each application of sodium perborate paste did not appreciably retard ulceration and sloughing of the gingival mucosa.

Dog D: Repeated treatments with "neutrox" washed with water and flavored sodium perborate washed with water resulted in erythema, edema, ulceration and sloughing of the gingival mucosa. The response in this animal was the most definite of all in the experimental group.

Dog E: Treatments were of three minutes' duration and no wash was used. Unflavored sodium perborate and "neutrox" were applied. Only a pronounced erythema resulted after twelve applications with each drug. The response to treatment in this animal was apparently mild and the fact that the experimental pastes were not washed away by artificial means did not exert an appreciable influence. Edema, ulceration and sloughing resulted from application of sodium hydroxide paste.

In general, all the drugs resulted in the following sequence of changes in all animals with the exception of dogs B and E, in which the severity of the completed sequence was not attained:

Slight generalized erythema.

Pronounced glistening erythema with diffuse edema.

Isolated strikingly red zones with a roughly granular surface to which adherence of the experimental paste followed washing. Adherence of the paste did not occur before the appearance of this surface change.

Alteration of the above-mentioned zone to form elevated bleblike lesions covered with a gray, moderately friable pseudomembrane surrounded by an extremely red rimlike linear elevation. The experimental paste adhered to these lesions and altered the color from gray to orange-yellow.

Shriveling and sloughing of the pseudomembranous covering, which at first exposed pinpoint hemorrhagic spots and eventually resulted in the denudation of the depressed central hemorrhagic region which was surrounded by a linear red elevated rim. Repeated treatments resulted in an enlarged lesion, but did not alter the severity.

Cessation of treatment resulted in the following changes:

Extension of finger-like gray translucent projections, which originated at the periphery and extended centrally in a lattice formation until the underlying redness was barely perceptible through an overlying gray sheen. This covering increased in thickness and completely obliterated the underlying surface, filling the crater-like depression up to the limit of the surrounding rim.

A firm pale elevation, the glistening covering of which was continuous with the surrounding mucosa. Although it was possible to produce ulceration in the surrounding tissue by instituting repeated treatments, these healed lesions were resistant and could not be appreciably altered.

HISTOLOGIC FINDINGS

In the untreated quadrants, the gingival mucosa presented histologic features markedly resembling those of the human gingival mucosa. On the labial aspect, a covering of stratified squamous epithelium gradually diminished in thickness from the tip of the gingival margin to the mucobuccal fold. Papillary epithelial projections, more pronounced in the marginal region, extended into the underlying connective tissue. A single basal layer of cuboidal cells, a stratum spinosum, extremely thin keratohyalin and lucidum layers and a stratum corneum were observed in varying proportions, depending on the region examined.

Immediately subjacent to the epithelium, the connective tissue presented a papillary layer comprised of a loosely arranged, irregular meshwork of collagenous fibrils interspersed throughout which was a rich network of capillaries and lymphatic vessels. The connective tissue under the papillary layer was comprised of densely packed bundles of horizontally disposed collagenous fibrils. Occasional elastic fibrils could be demonstrated in both connective tissue layers.

Fig. 3 (Dog B).—Flavored sodium perborate; wash water. Depressed spherical lesion covered by friable gray pseudomembrane and surrounded by elevated erythematous rim.

The gingival margin in both treated and untreated quadrants showed chronic inflammation. (Fig. 4.) On the inner aspect of the gingival crevice, a thin stratified squamous epithelial lining devoid of keratinized covering was observed. The connective tissue between the lining of the crevice and the labial epithelium presented a pronounced vascularity and edema and was crowded with lymphocytes and plasma cells.

The experimental pastes produced a non-specific acute fibrinous inflammation of the subepithelial connective tissue of the gingival mucosa, with necrosis in the most severe instances. The following changes in the epithelium progressively accompanied the onset of inflammation: intracellular and extracellular edema, invasion by polymorphonuclears (Figs. 5 and 6) and deposition of fibrin, degeneration and necrosis of the epithelium and formation of a reticulum of fibrin, necrotic epithelial cells and polymorphonuclears (Fig. 7), which comprised the pseudomembrane observed clinically. Sloughing of the pseudomembrane exposed the underlying markedly vascular connective tissue. In some instances, the necrotic zone was separated from the surrounding mucosa by a markedly vascular rim of connective tissue covered by thinned out epithelium. In others, the necrotic zone blended with the surrounding connective tissue and presented a transition region in which progressive degenerative changes were observed in the epithelial cells (Fig. 8). The latter condition afforded the mechanism for the lateral spread of the lesion and its increase in size.

The initial evidence of healing on the part of the epithelium was represented by the epithelial strands, which extended from the surrounding epithelium undermining the central necrotic zone and were clearly separated from it. These strands appeared in those animals killed while still undergoing treatment. Similar epithelial strands were described by Hartwell[7] in an experimental study of epithelial changes in healing surface wounds. In the more advanced stage of healing, inflammation was absent and

epithelial strands extended from the adjacent hyperplastic epithelium to cover the connective tissue (Fig. 9).

Aside from the fact that different dogs presented lesions of varying severity, no histologic basis could be found for the individual differences that the animals presented clinically in response to treatment with the experimental pastes.

Fig. 4 (Dog B).—Gingival margin showing dilated blood vessels and pronounced infiltration of leukocytes. (Hematoxylin and eosin; ×130.)

DISCUSSION

Each animal presented a marginal gingivitis with erythema and edema at the outset of the experiment. This condition persisted throughout the experiment and in no instance was it alleviated by either application of the experimental pastes or the fact that the drugs were present in the oral fluid in varying concentrations comparable to the conditions that would result from repeated mouth washes. In the animals in which the applications actually covered the gingival margin, the inflammation was aggravated. These observations strongly suggest that neither sodium perborate or "neutrox" is of therapeutic value in the alleviation of chronic marginal gingivitis resulting from crevicular accumulations or from insufficient masticatory stimulation.

Neither neutralizing the alkaline sodium perborate in the powder form as in "neutrox" or attempting to neutralize the tissue surface with an acid wash was effective in diminishing the harm done to the gingival mucosa. A greater reduction in the response of the gingival mucosa to the experimental pastes than

that produced by washing with acid was associated with constitutional differences in the individual animals. These facts are contrary to the findings of Schroff[5] and also raise some question regarding the extent to which the alkalinity of perborate washes and pastes governs the tissue disturbances resulting from their use. The fact that the changes produced by the use of sodium hydroxide paste resemble those which result from the use of perborate is not particularly relevant as these changes are non-specific and inflammatory.

It has been suggested[8] that the adherence of perborate particles to the tissue might in part be responsible for the resultant pathosis. We observed that a

Fig. 5 (Dog B).—Unflavored sodium perborate; wash water. Early lesion showing edema of epithelial cells. (Hematoxylin and eosin; ×62.)

thin film of experimental paste covered the gingival mucosa after treatments. In the early stages of treatment, when the mucosa was smooth and glistening, use of the wash was effective in removing most of this material. Subsequently, the appearance of roughly granular patches on the mucosa afforded areas to which the experimental pastes adhered after washing. In addition, the experimental pastes also adhered to the pseudomembranous covering of the elevated bleblike lesions and depressed areas of ulcerations. It is not possible, therefore, to evaluate the effect of the adherence of particles upon the progress of lesions resulting from the use of sodium perborate and "neutrox." It should be noted, however, that an initial alteration in the surface texture of the mucosa was required before the material adhered. Therefore, even if the adherent particles did influence the tissues, their major effect is dependent on previous alteration of the tissue by the pastes. The findings in dog E support this opinion. In this animal, where maximum adherence was possible because no wash was used, there were no zones to which the paste did adhere because the tissue response was not severe enough to produce suitable areas. Only an erythema resulted and the paste that remained after each treatment was rapidly washed away by the normal cleansing mechanisms of the mouth. It would appear, therefore, that since the initial adherence of the experimental pastes depends on a previous severe tissue change, those intrinsic factors in the initial response of these tissues are more significant than any secondary influence of adherent particles in determining the effect of the use of perborate in the individual case.

There was no indication of any palliative effect of either the perborate or "neutrox" upon the formed ulcerations or other lesions. In all instances, repeated treatments aggravated the lesion and retarded healing. Spontaneous healing occurred in all cases when the drug was discontinued.

CONCLUSIONS

Repeated applications of unflavored sodium perborate, flavored sodium perborate, "neutrox" and sodium hydroxide pastes caused varying degrees of inflammation, edema and ulceration in the gingival mucosa of dogs. There was an inherent variation in the response of individual dogs to these drugs. The lesions produced healed spontaneously with the cessation of treatment.

Applications of a control paste consist-

Fig. 6 (Dog B).—Detail of Figure 5; showing edema of epithelial cells with shrinkage of cytoplasm and invasion by polymorphonuclears from underlying connective tissue. (Hematoxylin and eosin; ×600.)

Fig. 7 (Dog D).—"Neutrox"; wash water. Zone of necrotic epthelial cells in dense meshwork of fibrin and polymorphonuclears. (Eosin and methylene blue; ×92.)

ing of 1 part of precipitated calcium carbonate and 4.5 parts of concentrated glucose syrup produced a slight diffuse erythema with no ulceration or edema. This erythema persisted for approximately one and one-half hours after application, at the end of which the tissues generally returned to normal. Repeated applications had no cumulative effect.

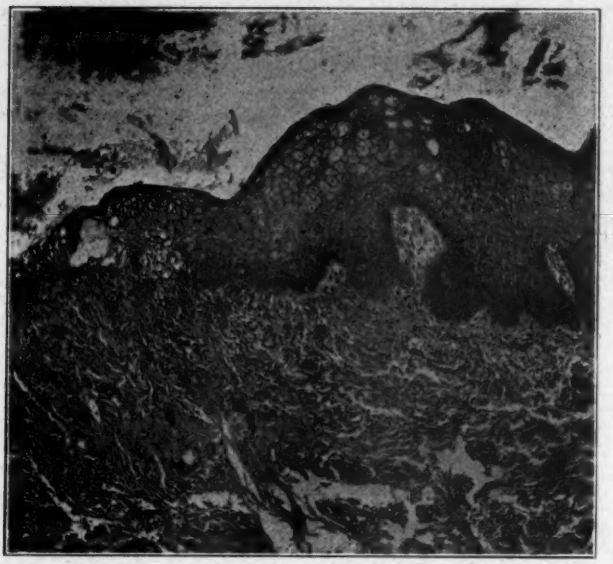

Fig. 8 (Dog D).—"Neutrox"; wash water. Margin of lesion showing transition between necrotic epithelial débris on extreme left and comparatively uninvolved epithelium on extreme right. There is vacuolization with vesicle formation in epithelium immediately adjacent to the lesion. (Hematoxylin and eosin; ×92.)

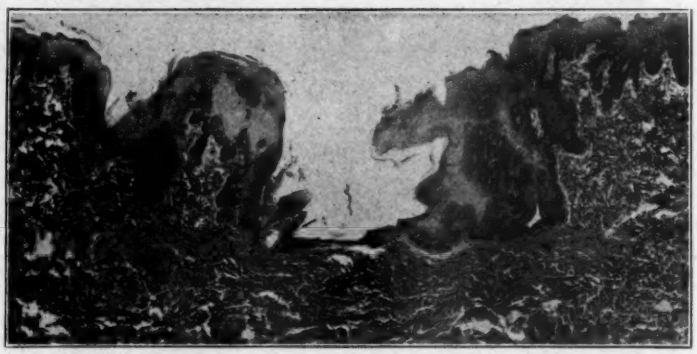

Fig. 9 (Dog A).—Unflavored sodium perborate; wash water. Partially healed lesion showing hyperplasia of epithelium on both sides of region covered by thin epithelial strand. (Hematoxylin and eosin; ×26.)

Washing with an acid solution of calcium monophosphate immediately after treatment with sodium perborate produced no appreciable alteration in the effect of perborate on the gingival mucosa.

In animals with preexisting marginal gingivitis associated with local accumulations in the gingival crevice, unflavored sodium perborate, flavored sodium perborate and "neutrox" were of no therapeutic value, nor did these drugs have

any palliative action on the non-specific acute inflammatory ulceration resulting from their use.

ACKNOWLEDGMENT

The authors are indebted to Dr. Esther Kaplan for her conscientious assistance in carrying out the experimental procedures and in preparing the manuscript. The assistance of Miss Irene MacKinnon, who prepared the tissues for microscopic study, is also gratefully acknowledged.

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ANATOMIC AMALGAM RESTORATIONS

WALDEMAR A. LINK, A.B., B.S., D.D.S., Chicago, Ill.

TODAY, the use of amalgam as a restorative material is reaching new heights, as it becomes the most widely used of all filling materials. Harold E. Tingley,[1] of Harvard University Dental School, said at the conclusion of a paper delivered on the subject of "Amalgam" before the First District Dental Society, New York in 1937:

> The making of amalgam restorations is like so many other things in life, the growing of roses, the making of photographs, the speaking of languages and the appreciation of wine. . . . To attain reasonable success with them, we have to know them, we have to study them, and most of all we have to love them.

Dentists must "love" amalgam, or they wouldn't make so many amalgam fillings. We "love" amalgam when the finished filling is nicely carved and polished; we "hate" it when we see it several years later with broken-down margins, discolored and dishonored. Yet how many times have we seen a large amorphous mass of amalgam literally hold a tooth together, though all support seems to be gone, the walls obliterated down to the very gingivae that rise up to nestle against and over the cemento-enamel junction!

It is always easier to condemn than to condone; easier to find fault than to remedy it; easier to criticize than to praise; yet it is only when we really take into consideration the many shortcomings and the long chain of circumstances which must be considered that we can evaluate and improve the status of this most widely used restorative material. We know that amalgam restorations do fail; we also know that many of them do not. Since it is easier to find reasons for failure, a human trait, let us first consider the reasons that amalgam restorations fail. First of all is the all-important matter of diagnosis. Amalgam cannot be used indiscriminately any more than can the gold inlay. The choice of material is governed by what is best for the tooth or teeth concerned, not by the intrinsic val-

Read before the Chicago Dental Society, Midwinter Meeting, February 22, 1944.

ues of the given material. Most of us have not mastered the use of this material to the point where we can sufficiently condense it in anterior teeth, where restoration of incisal angles is involved. Yet men like Sweeney, of Stockton, Calif., successfully use the material in these teeth in angle restoration and in three-quarter crowns completely made of amalgam. One could enumerate many instances wherein use of the material is contraindicated but, briefly stated, amalgam can generally be used where sufficient bulk of tooth structure remains to keep the material confined and sufficient protection is afforded to withstand the stresses of mastication.

One reason for failure in amalgam restorations is fracture. We find that most proximal restorations break in the marginal ridge area. It is not a matter of primary loosening; rather, looseness or falling out of the filling is secondary to fracture. Coy[2] has stated that in the cavity which has a proximal restoration, the proximal portion should be so designed as to not be dependent on the occlusal portion for retention. Easton[3] and Coy both state that there should be no frail margins in stress-bearing areas. Both of these men believe that the more closely the margins approach a right angle, the more stable will the amalgam be. To me, this matter of fracture can be overcome to a great extent by proper cavity form.

Compared with inlay gold and gold foil, amalgam is a weaker material, with a lower tensile and crushing strength. In the main, fracture can be overcome by insuring sufficient cavity depth so that the amalgam restoration will have adequate bulk to withstand the forces of mastication. Many times these marginal ridge fractures are produced by the operator himself, resulting from the improper or careless removal of the matrix retainer and band. The band should be lightly freed from the tooth, never forced. If force is used, a slight crack will be produced, which may not be detected at the time of removal.

Another common area of fracture is along the occlusal margin. Often, the material is blamed for this, but frequently the enamel rods are left unsupported during cavity preparation; or some of the enamel rods are pulverized during the condensing process, with the result that an unseen fracture occurs which does not become evident until some months later, though instituted at the time of insertion.

A second cause for failure is improper cavity preparation. The box-type cavity affords more retention than the semibox type, especially over areas subjected to the forces of mastication. A small gingival channel may be cut along the gingival floor to give added retention. The channel should be placed so that at least 1 mm. of dentin supports the enamel rods; otherwise, the rods may be fractured during the condensation process. I do not bevel the rods at the gingival floor because the amalgam will be too easily forced beyond the gingival confines of the matrix and an overlap at the gingival margin will result. Undercuts for retention are recommended by many men. Sweeney recommends undercuts under cusps and roughening or scratching of the pulpal floor. Ward says that perpendicular walls are a sufficient means of retaining the amalgams, since the material itself expands and good adaptation results. The only danger that I can see from using undercuts is that they may become reservoirs for mercury. Undercuts should be away from the pulp, under the greatest bulk of the tooth. They should be an integral part of the preparation, and not merely an extension of the cavity. The use of a fine round bur or a small inverted cone bur for this purpose has little value. The amalgam cannot be condensed in such a small area, as no plugger point is small enough for this purpose. The beveling of the occlusal cavosurface angle is contra-

indicated, because of the above mentioned weakness, edge and crushing strength of amalgam. No unsupported enamel rods should remain when the cavity has been prepared. These, if left, may subsequently be fractured either in the condensing process by the plugger point or during mastication. When a fracture is noted, we are apt to blame amalgam for the failure, whereas the fact remains that the rods are fractured first, then the unsupported amalgam crumbles, and a defective margin results. If we are not sure about the condition of the enamel rods, the Woodbury binoculars should be used to examine the cavity. A building is as good as its foundation, and a good amalgam restoration must have a solid foundation. It is also essential that we observe the principles of good cavity preparation from the standpoint of extension for prevention. The class 5 cavity must be made particularly retentive. Sweeney cuts the end off a No. 2 round bur and undercuts the entire dentin wall of the cavity.

The cavity in which amalgam is to be placed should be at least 1 mm. below the dentino-enamel junction in order to give sufficient bulk to the restoration. This should be kept in mind regardless of whether a cement base is used. The depth will allow sufficient bulk of amalgam for carving and polishing and will meet the requirements of masticatory stresses and strains.

The Bronner[4] type of cavity preparation is especially recommended in proximal amalgam restorations of the mesial surfaces of upper premolars or bicuspids. This preparation and the resultant restoration is far less conspicuous and conserves some tooth structure. The Bronner type cavity is basically triangular, with the base of the triangle at the gingival border of the tooth, and is a definite box-type cavity, showing a definite boxing in the proximal area. This boxing may continue until the cavosurface angle of the tooth is reached or it may terminate at the axiopulpal line angle.

A third reason for failure of the amalgam restoration is improper trituration. The mercury: alloy ratio should be such that a workable plasticity is assured with a minimum amount of trituration. The usual ratio of mercury to alloy is 8:5. How to triturate amalgam is a matter for the individual to decide. Some men use the hand method, others the mechanical method, the "Wig-L-Bug." The pressure-controlled method is also in use. Regardless of the method used, each alloy particle should be well triturated. After the alloy and mercury are introduced into the mortar, the mercury swims and skims over the mass of alloy. When trituration is begun, the mercury breaks up into droplets. The particles of alloy then take on a portion of the mercury and further trituration results in a blackish mass. Continuing the same pressure, we soon find that the mass takes on a lighter color and now shows plasticity. As we continue, we note that the triturated mass begins to thin out and some of it rolls up the sides of the mortar, then falls to the floor of the mortar. At this stage, it will be noted that there are probably a number of unamalgamated alloy particles bouncing around. If the amalgam were condensed at this stage, corrosion would result.[5] Therefore, it is usually necessary to empty the mortar into a piece of rubber dam and rub from twenty to thirty times to be certain that all alloy particles are completely coated with mercury. It is then that trituration is complete. No one can say how much time is consumed in this process because of the human variant. Every package of alloy that is accepted by the Bureau of Standards contains instructions which, if followed, will assure proper trituration.

Undertriturated amalgams tarnish more and are rougher than overtriturated.[6]

Contamination[7] is another cause for failure of an amalgam restoration. Cleanliness is of the utmost importance, since

a restoration may be ruined by contamination regardless of the source. All instruments and the mortar and pestle must be clean. The empty mortar as delivered from the supply house should be further prepared by grinding[8] with the pestle. It is recommended that several of these be on hand and that pestles and mortars have corresponding numbers and be used in pairs.

Contamination may result from an unclean mortar or pestle. Small pieces of previously triturated amalgam sometimes adhere to either the mortar or the pestle, and their presence will affect the finished product. What Prime calls bonemeal, débris of the cavity preparation, is also a foreign body, the presence of which will affect the final result. We would not think of leaving anything like this when preparing a cavity for gold foil or an inlay, and it is unthinkable to do so in an amalgam restoration.

To avoid contamination, dryness is of paramount importance. Amalgam should not be introduced into a saliva-soaked cavity. Much of the discoloration evidenced in the amalgam restoration is caused by salivary contamination. The formation of sulfides and oxides is the result of chemical action between the saliva and the amalgam.[7]

For a long time, amalgam was mulled in the hand after trituration. Desquamated epithelial cells, sebaceous fluids, salt, etc., were incorporated in the mass and contamination resulted. The Bureau of Standards has conducted many experiments to show that excessive expansion also follows this procedure. Amalgam may be mulled in the small squeeze cloths or run between the forefinger and thumb, on which rubber thumb stalls have been placed. If the "Wig-L-Bug" is used, mulling can be accomplished by removing the small steel slug and then replacing the mix in the capsule and running the machine for a few seconds. The mix will then roll from the capsule in a ball and cleanse the capsule of amalgam, which would otherwise set and contaminate the next mix.

Contamination can arise from placing a new amalgam filling against an old one or one previously placed.[9] Theoretically, this should not be done, but, in my own practice, I have placed new fillings against old without any noticeable ill-effects. Where good retention can be gained, no untoward results have been encountered.[10] Contamination causes corrosion and discoloration of the finished filling, a weakened, laminated and pitted mass.

The fifth cause of amalgam failure is improper matrix application. No special type of matrix is advocated. The matrix that meets the requirements for the individual tooth concerned should be the matrix of choice. It should be properly contoured and stable enough to withstand the condensing pressure. The amount of pressure used will depend on the manner in which the matrix is applied to the tooth. A loose-fitting matrix will naturally stand less condensing pressure than a tightly fitted and stable one.

Many times, it will be necessary to reinforce a band with a wooden wedge. This may be conveniently cut from a tongue depressor or from an orangewood stick. It is triangular with the base of the triangle at the gingival portion. It is recommended that wedges be soaked in water before introduction. These wedges are always introduced from the lingual aspect, because the embrasure is larger than on the buccal. Compound may also be used to reinforce the band. Care should be exercised when removing the band. The matrix band height is important. It should extend well over the marginal ridge of the tooth, yet it should not interfere when the patient closes the jaws for the purpose of checking the occlusion. Injury to the supporting tissues should be avoided and the band may be so trimmed that injuries will not occur.

Improper removal of the matrix will cause an amalgam restoration to fail also. We find that, in many cases, fracture is prevented if the matrix is carefully freed from the tooth. If it is carelessly freed, fracture will result which will not be in evidence until later. In other words, the crack cannot be detected by the eye at the time of removal. When properly condensed, the matrix can be removed immediately after the condensation process has been completed.

An improper condensation technic is another cause for amalgam failure. Black has said that if we will use the instrument, the plugger, which most nearly fits the cavity, a great portion of the condensing problem will be solved. Using too small a plugger point for this purpose results in a lack of condensation, and we merely make holes in the amalgam and do not condense it. Today, amalgam condensers are so designed that it is easy to use properly made condensers. These fit the proximal portion of the cavity, and the occlusal portion also can be thoroughly condensed with the specially designed plugger. The amount of pressure used to thoroughly condense amalgam again varies with the individual. It has been found that an individual can exert a great pressure for the first few thrusts. Thereafter, if thrusting is continued with a two-second interval between thrusts, the pressure exerted diminishes to about 90 per cent from the original thrust. We should apply a firm pressure and condense in an orderly manner, similar to that in which gold foil is condensed in a definite pattern. Care should be exercised not to fracture any unsupported enamel rods. The automatic condenser can be used. The newly designed Sweeney[11] amalgam condensers adequately meet all the requirements for amalgam condensers, and they are so designed that greater force can be exerted than with pluggers of earlier design.

It is generally agreed that an amalgam filling, after placement, should contain 50 per cent amalgam and 50 per cent alloy. Therefore, it is important that the excess mercury be removed as the condensing process continues. A mercury-laden filling is weak and is porous. In larger restorations, it is advisable to make the fillings in relays rather than to triturate a large mass at one time and allow this to remain on the bracket. Many times, crystallization occurs before the amalgam is placed. When fresh amalgam is triturated (and this can be done by the assistant while the operator is condensing the amalgam), a better restoration will result and the condensing process will not be hurried.

Improper finishing and polishing has been given as another cause for failure of amalgam restorations. The overlap which occurs at the gingival margin should be removed at the time that the amalgam is polished. No amalgam margin should be touched which cannot later be polished to a fine finish. Therefore, it is advisable to remove the overlap after setting is complete. This is done with fine files and the resulting surface will be smooth. If it is done at the time that the regular carving is made, a rough surface will result.

All finishing and final polishing should be done under moist conditions. The generation of heat will force mercury to the margins of the amalgam and the result again will be a weakened amalgam. Gray[12] has shown that the transition point of amalgam is about 70° C. Finishing burs and stones must be lightly used, for, in the presence of water, these cut much faster than when used under dry conditions.

Carving of the amalgam is begun immediately after the amalgam has been condensed into the cavity. This should be parallel to the margin, not toward the margin: this practice may result in submarginal carving. Polishing should be done from five to seven days after the filling has been condensed and carved.

Lack of after-care of the patient is another factor in failure of an amalgam restoration. Patients should be instructed that proper home care is essential for the preservation of an amalgam restoration. We emphasize the importance of home care for the maintenance of prosthetic restorations, and the same advice should be given to the patient in regard to the amalgam filling. Amalgam, if expected to retain its color and luster, must be brushed regularly by the patient. Débris and suppurative pockets between the teeth contribute to tarnish and corrosion. The patient should be told that the future of the restoration depends on home care. Some dentist should write an article on the subject of ice cream and coffee. We like to experience the extremes of heat and cold at approximately the same time, and these temperature variations do affect restorations. I do not advocate the elimination of ice cream and coffee from the diet, but we do know that amalgam restorations are profoundly affected by temperature changes and heat causes a diffusion of mercury to the surface, with a resultant weakening of the restoration.

Lastly, the use of amalgam where it is contraindicated is a cause of failure of this type of restoration. Sound walls should be the support for amalgam. We should use as much care in deciding to employ amalgam as in determining when the use of the gold inlay or gold foil is indicated. The gold foil restoration is scarcely ever used without the rubber dam. Amalgam, to be successful, should be placed under as favorable conditions as either foil or inlay. Amalgam cannot be satisfactorily used where frail enamel walls are present. We have seen the results of this practice: fractured buccal or lingual walls. Obviously, cusps cannot be restored with amalgam unless sufficient bulk is provided over these areas.

CONCLUSION

I should like to add this word of comparison: Too many times, the amalgam restoration has been cheapened by the dentist. I do not see why there should be a difference in fee for an amalgam restoration and a gold inlay. We lay too much stress on the intrinsic value of gold rather than upon the influence which our efforts and our services exert upon the health of the patient. It is the direct restoration, condensed in the cavity. We seldom see the decay *underneath* an amalgam filling that we see underneath the inlay. The salts, sulfides and oxides which are deposited underneath the restoration area have a far greater antiseptic effect than the cement that is used to hold the inlay in the tooth. We have seen many teeth filled with amalgam in which the margins are badly broken down and only the amalgam itself remains, yet the pulps are vital. They have been protected.

This is not true in the case of the inlay. Here, many times, recurrence of decay has caused pulp damage. So, year for year, the amalgam filling will compare favorably with the inlay if the same care in cavity preparation, the same care in making the prosthesis, the same care in polishing and instructions for home care to the patient is given.

No poor filling material can stand the test of time that amalgam has and be considered inferior. Impression materials have their variables, so do acrylics, and silicates. Even dry sockets are not pleasant to confront. With amalgam, when carefully used, when each step of the technic is carefully followed, results will be commensurate with the efforts applied. Let us not blame the amalgam if failures occur, but rather look to our own shortcomings in handling the material. The man with a one track mind regarding inlays blames the cement for his failures when failure is evident: he has that advantage at least. The amalgam technic is an exacting one. Amalgam is not a substitute for gold, but a worthwhile adjunct in the practice of restoring teeth,

which, after all, is the purpose of dentistry.

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FUNGI AND BACTERIA ANTIBIOTICS: A REVIEW

JEROME L. FECHTNER, D.D.S., Plainfield, N. J.

THE dental profession follows with interest and enthusiasm the rapid development of one of the greatest chemotherapeutic advances of the decade. An ever closer correlation between medicine and dentistry demands that medical progress and research receive attention and study from members of the dental profession. This type of cooperation is admirably illustrated by the recent incorporation of a rational employment of the various sulfonamides in the realm of dentistry and oral surgery.

With similar interest in further medicodental progress, the dental profession should keep abreast of the important and significant developments of the various fungi and bacteria antibiotics. In preparing for the time when these substances will become available to the civilian population, the chemical, biologic and clinical reports should be closely followed.

From the Muhlenburg Hospital.

FUNGI ANTIBIOTICS

History.—In 1929, Alexander Fleming, of London, published a report on a powerful antibacterial substance, which was produced by a certain type of penicillium mold. The active substance, found in the filtrate of broth cultures of the mold, was named penicillin. Because penicillin was shown to be relatively non-toxic and non-irritant to animals, its possible use as an antiseptic against "penicillin-sensitive" microbes was suggested.[80] From 1929 to 1940, investigations of the antibiotic properties of several types of molds, and efforts to isolate the antibiotic substances were made.[17, 21, 88, 89, 90]

In 1940, Chain, Florey *et al.* reported the therapeutic possibilities of penicillin.[12] Carefully controlled experiments on variously infected mice revealed the protective power of penicillin against certain types of infection. The organisms sensitive to penicillin included: *Cl. wel-*

chii, Cl. septique, Cl. oedematiens, Corynbacterium diphtheriae, Str. pyogenes, Str. viridans, Str. pneumoniae and three types of staphylococci. It was shown by Abraham and Chain that certain types of bacteria contain an enzyme, penicillinase, which destroys the bacteriostatic property of penicillin.[1] These types of bacteria would be resistant to penicillin therapy.

At about the same time, Fleming described *in vitro* tests comparing various sulfonamides with penicillin.[32] Penicillin proved to be more potent than the sulfonamides, uninhibited by pus and products of infection, and was apparently non-toxic.

In 1941, Florey, Chain *et al.* reported further observations on penicillin.[2] "Small-scale mass production" was in progress at Oxford, and ten patients had received penicillin therapy; a pyrogenic impurity, which was later removed, caused the only toxic effects.

Since 1941, great strides have been taken in the methods of purification and mass production of penicillin. American and British literature contains the reports of many investigators, and penicillin therapy now reaches the stage of definite clinical effectiveness in a wide variety of diseases. The story of such progress is almost phenomenal in the efficient swiftness of biologic and clinical development. "For the rapid development of this knowledge we are all indebted to the practical and expert direction of the Committee on Chemotherapeutic Agents of the National Research Council, to which the responsibility for this all-important clinical investigation was entrusted by the Committee on Medical Research of the Office of Scientific Research and Development."[74] In August 1943, the medical profession of the United States was acquainted with the results which had been obtained in the treatment of 500 cases of infections of various types.[58]

"Much of the purely scientific information about penicillin and related compounds must remain a closed book until the end of the present hostilities. When the complete story may be told, it will prove to be one of the most interesting and exciting stories of modern medicine."[74]

Description.—Various types of antibacterial mold products from different strains of molds have been described in the literature. Puberulic acid ($C_8H_6O_6$), a quininoid body, and puberulonic acid ($C_8H_4O_6$), a quinol corresponding to it, have been described as the antibacterial substances from certain species of penicillium.[7, 8, 70] Citrinin ($C_{13}H_{14}O_5$), a metabolic product of *Penicillium citrinum,* is another antibacterial mold product.[69, 85] Other antibacterial substances which have been described in the literature include fumigatin, a product of *A. fumigatus*[5]; spinulosin, a product of *P. spinulosum*[56]; claviformin, a product of *P. claviforme*[14]; penicidin[6]; gliotoxin, a product of *Gliocladium fimbriatum*[28]; fumigacin, a product of *Aspergillus fumigatus*[101]; clavacin, a product of *Aspergillus clavatus,* and streptothricin[100] and actinomycin,[103] products of actinomyces. Some of these products are bacteriostatic or bactericidal *in vivo,* some only *in vitro*[102]; some are very toxic and have no therapeutic application,[104] and none will probably enjoy the astounding clinical success of the products of *Penicillium notatum.*

Penicillium notatum, which is the source of penicillin, also gives rise to a second antibacterial substance, variously called notatin,[18] penicillin B[91] and penatin.[59] This product, which is a protein, seems to have some therapeutic indication, as it attacks some gram-negative bacteria which are not susceptible to penicillin.

Penicillin, the filtrate of a broth culture of *Penicillium notatum,* is the antibiotic that has proved its therapeutic implications and possibilities. The active constituent of pure penicillin is believed

to be penicillic acid,[27] the barium salt having the formula $C_{24}H_{32}O_{10}N_2Ba$.[3, 4, 68] The acid, which is dibasic, forms yellow crystals upon slow precipitation.[68] The chemical constitution and structure have not yet been determined, as only recently have pure crystals of sodium penicillin been obtained.[73, 74] Penicillin is hygroscopic and must be kept in a desiccator in the dry state.[2] If the barium salt is kept dry, it will remain active for eight months. Its antibiotic power is retained for several months in an aqueous solution at 2° C., but only for about twenty-four hours at 37° C.[4] In water, it is most stable at a pH of 5-7.[13] It is very soluble in ether, alcohol and acetone, less soluble in carbon tetrachloride, benzene and chloroform. It is inactivated by oxidizing agents, acids, alkali and heat.[4]

The amount of penicillin may be measured as in inverse ratio to the growth of *Staph. aureus* in meat extract broth.[35] The Florey unit, which is the same as the Oxford unit, is that amount of penicillin which, when dissolved in 50 cc. of broth, just completely inhibits the test strain of *Staph. aureus*.[74]

The formation of penicillin depends on many conditions: the proper strain of penicillium, the condition of the inoculum, the source of the nitrogen, the general constituency of the medium, the duration of the incubation, the influence of traces of heavy metals, the carbohydrate concentration and the pH of the medium.[36]

> The difficulties which confront large scale production are very great. They arise chiefly from the fact that in the metabolism of the mold only very minute amounts of penicillin are formed and those only after days of growth. . . . In impure solutions penicillin is unstable; it is destroyed by bacterial or other contaminations to which the culture fluids are highly susceptible. Difficulties have been encountered in choosing the most productive strains of the mold and the most suitable culture mediums, in the development of methods for extraction and purification and in stabilization of the purified product.[72]

Biologic Action.—Penicillin may act as a bacteriostatic agent or as a bactericidal agent.[50, 65] Thus, penicillin prevents multiplication of organisms and also brings about a definite decrease in the number of organisms. The sulfonamides, in contrast, only slow up the rate of growth. Penicillin is not bacteriolytic, and acts by interfering with the essential bacterial metabolic processes.[99] It is neither absorbed nor destroyed by the bacteria. In contrast to the inhibition of sulfonamides, the bactericidal action of penicillin is actually increased by the presence of blood or serum, but only if multiplication of the bacteria occurs.[52] The efficacy of penicillin is not reduced by body fluids and tissues, by the number of organisms, or by the metabolic products of infection. Penicillin is less toxic to leukocytes than are the sulfonamides.[2]

The organisms which are susceptible *in vitro* to penicillin include the pneumococcus, staphylococcus, meningococcus, gonococcus and lactobacillus, *Str. haemolyticus, Str. viridans, B. subtilis, Cl. welchii, Vibrio septicus, Cl. histolyticum, B. sporogenes, B. oedematiens, B. sordellii* and *Cryptococcus hominis*. Resistant organisms *in vitro* included *Haemophilus influenzae, B. coli, B. typhi, B. dysenteriae, B. proteus, B. paratyphosus A., B. enteritidis, B. pyocyaneus, B. fluorescens, B. prodigiosus,* Friedlander's bacillus *(K. pneumoniae), Monilia albicans, M. krusei and M. candida*.[49]

In addition to the natural resistance of certain types of organisms to the antibacterial action of penicillin, cases of developed resistance of normally penicillin-sensitive types have been reported. In *in vitro* and *in vivo* tests, staphylococcus and pneumococcus strains developed a resistance after the continued use of penicillin.[24, 64] Despite this resistance of an organism after continued use of penicillin, high enough concentrations of

penicillin will produce sterile cultures.[77] It is of importance to note that organisms which are sulfonamide resistant will respond to penicillin therapy, and that many organisms which do not respond to penicillin will be susceptible to the sulfonamides. "Once a strain increases its resistance (due to continued use of penicillin), it loses its virulence and seems to be changed permanently as far as penicillin is concerned, but it remains susceptible to the sulfonamides."[58]

Absorption, Excretion and Toxicity.—Oral administration of penicillin is unsuccessful because of the bitter taste and poor absorption.[79] It is believed that the gastric acidity may destroy penicillin.[2] Rectal doses were poorly absorbed.[79] Intramuscular administration resulted in rapid absorption; subcutaneous administration, in slow absorption. Intravenous administration assures the greatest absorption, with an early high plasma concentration. An abrupt fall in concentration occurred with an average urinary excretion of 58 per cent of the administered dose, the greatest amount being excreted in the first hour.[79] Herrell *et al.* state that from one-half to one-third of the administered dose was excreted in the urine.[48] No penicillin was recovered from the saliva, tears or spinal fluid. The average penicillin concentration of erythrocytes was less than 10 per cent of the plasma concentration.[79]

Because of the rapid excretion, frequent small doses of penicillin are more effective than less frequent larger doses, in maintaining a high, fairly constant blood level. Continuous, or nearly continuous, intravenous drop administration has been suggested to keep a high constant level.[42, 43, 79] Treatment must continue until all clinical signs have disappeared and all cultures are negative.[34]

Penicillin is of particular value in closed abscesses and infections because it has the power to diffuse and remain active in body tissues and fluids, products of infection and bacterial metabolism and necrotic tissue.[71, 78]

It has been concluded that non-pyrogenic penicillin is non-toxic within the range of therapeutic dosage.[41, 43, 51] In 500 cases, many series of reactions observed were transitory. Occasional chills and fever, urticaria, headache, tenderness and thrombophlebitis at the site of injection have been noted. In all, there were sixty-nine cases with reactions, a very low incidence considering that the material used in the testing was only from 10 to 15 per cent pure penicillin.[58]

The antibacterial action of penicillin has been satisfactory in the treatment of infections by topical application of penicillin.

Therapeutic Use.—Penicillin can be used locally or parenterally. Since the total volume of intramuscular injections should be small, a solution of 5,000 units per cubic centimeter of isotonic sodium chloride has been used. For intravenous use, concentrations of 1,000 units or less per cubic centimeter were used, according to the dosage and the desired time of infusion. For local use, concentrations of 250-500 units per cubic centimeter are employed.[58]

The dosages varied from 1,000 to 25,000 units an hour, depending on the type and severity of the infection. The fact that certain organisms are less sensitive to penicillin than others would alter the dosage.[9] It is desirable that a concentration of penicillin be maintained which will just inhibit the growth of the organism of infection. At this stage of development, definite dosage indications have not been determined. The detailed use of penicillin in the treatment of infections is described by Keefer *et al.*[58]

Among the diseases which have responded favorably to penicillin therapy are: acute osteomyelitis, carbuncle, furuncle, cellulitis, postoperative wound-infection, multiple abscess, chronic osteomyelitis, parotitis, abscess of the mouth

and cheek, posttonsillitis sepsis, actinomycosis, chronic wound sinus, unhealed compound fracture and streptococcic, pneumococcic, gonococcic, meningococcic and staphylococcic infections.[11, 34, 41, 42, 58, 72, 75, 77]

Comment.—Penicillin, a powerful, efficient, non-toxic antibacterial substance has proved its value in the treatment of many and varied types of infection. With increased clinical research and production, penicillin will prove a valuable addition to the physician's armamentarium. As with the sulfonamides, the dental profession will employ the newer antibacterials as their rational use comes to be indicated by laboratory and clinical research. From possibilities and implications present in the literature on mold antibiotics, penicillin may, in the future, be indicated to the dentist in the treatment of facial cellulitis, parotitis, chronic wounds, postoperative infection, unhealed compound fracture, acute abscess, actinomycosis and acute and chronic osteomyelitis.

When a supply of penicillin becomes available, dental research workers will evaluate the possibilities of penicillin therapy as part of the dental materia medica. At present, penicillin supplies are on a strict priority basis, being carefully allocated to research workers and the armed forces.

BACTERIA ANTIBIOTICS

History.—The production of bacteriotoxins by soil-supported bacteria was mentioned in 1929.[62] Through the succeeding years, various antibacterial substances produced by bacteria were referred to in the literature. Before 1939, the antibacterials included prodigiosin,[67, 87, 108] xanthoraphin,[60] pyocyanine,[29, 48] toxoflavin[95, 97] and oxychlororaphine.[61] In February 1939, Dubos described an antibacterial substance produced from an unidentified spore-bearing soil bacillus.[20, 21, 22, 23] Three compounds were isolated; graminic acid, gramidinic acid and gramicidin.[24] In 1940, the graminic acid was renamed tyrocidine-HCl, and the bactericidal agent containing gramicidin and tyrocidine was named tyrothricin.[53] Since that time, many *in vitro* and *in vivo* experiments have demonstrated the therapeutic value of tyrothricin.

Description.—Tyrothricin is the crude extract obtained from the aerobic spore-bearing bacillus *B. brevis*, which can be fractionated into gramicidin and tyrocidine.[55, 94, 96] The maximum amount of gramicidin is about 20 per cent.[55] Gramicidin is a polypeptide, a colorless substance with a melting point of 230-231°.[15, 54, 55, 99] Tyrocidine-HCl is the salt of a polypeptide having basic amino groups.[54] Different amino acids have been identified from the two substances.[63] Both substances are insoluble in water.[55]

Biologic Action.—The action of tyrocidine on cells causes inhibition of metabolic functions and lysis. Tyrocidine has enhanced penetration powers because it acts to lower surface tension; which causes concentration of the drug at the intersurfaces of organisms.[93] Gramicidin inhibits the metabolism of adenosine triphosphate; which may be the cause of its bacteriostatic action.[56] It is believed that, primarily because of the tyrocidine content, tyrothricin is hemolytic and leukocytolytic.[16, 83] Organisms that are sensitive to tyrothricin include *Strep. haemolyticus, Staph. aureus, Strep. faecalis*[92] and micrococci.[98] Since, under different conditions, gramicidin and tyrocidine affect the oxidation-reduction systems of organisms differently, in tyrothricin (in which both are present in a mixture) the effect of gramicidin may entirely obscure a narrow range of tyrocidine concentration.[26]

Absorption, Excretion and Toxicity.—Since gramicidin and tyrocidine are insoluble in body fluids and have a high toxicity, they should be used only locally.[84] It has been stated that tyrothricin causes disintegration of white blood

cells.[16, 93] While it has been reported that the topical use of tyrothricin does not damage tissues,[44, 45, 38] it should never be used in such a way that it might come into contact with the blood in circulation. Tyrothricin causes active hemolysis of erythrocytes owing to either the gramicidin content[40, 44, 45] or the tyrocidine content.[80, 83] In blood or serum, tyrocidine and tyrothricin lose their bactericidal properties.[94]

Therapeutic Use.—Tyrothricin has been used successfully in the treatment of local infections,[44] especially those caused by *Strep. haemolyticus*.[37, 46] Application of the powder directly to the wound was irritating. From 0.5 to 1.0 cc. in alcohol and glycerin added to distilled water proved to be of value.[47] Staphylococcic infections do not respond well to tyrothricin therapy.[10, 47, 81]

Because of red blood cell lysis and the reduction of germicidal properties in the blood stream, tyrothricin should never be allowed to come in contact with the blood stream.[25, 38] Its use has severe toxic reactions.

The amount of tyrothricin in bacterial cultures may be determined by a method utilizing the hemolytic property of tyrothricin.[19]

Comment.—At the present time, the uses of tyrothricin, gramicidin and tyrocidine are very limited. The toxic properties of these compounds prevent their internal use, and it seems reasonable to predict that they may be limited to the treatment of local infections. These antibacterials may be of interest to the dentist if it can be shown that they are effective against organisms present in the oral infections.

It has already been demonstrated that tyrothricin is effective *in vitro* against *L. acidophilus*.[57, 105] Other oral organisms have been demonstrated to be sensitive to tyrothricin *in vitro*, and, in the few cases tested, tyrothricin was not toxic when applied to oral mucous membranes.[57]

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COMPLETE DENTURES IN TWENTY-FOUR HOURS

AN Army dentist can take an impression of a soldier's teeth and within twenty-four hours the soldier can be completely fitted with full upper and lower dentures. This speedy service can be given as the result of renovation and systematization at the two "model" dental clinics in the Fourth Service Command. Both clinics are located at Augusta, Ga. One is at Camp Gordon and the other at Oliver General Hospital.

Fig. 1.—Waiting room and record section at Oliver General Hospital, Augusta, Ga. Patients are received in this room and routed to various departments of the clinic. This office maintains the clinical records.

Such speedy service is not routine at either clinic, but, when necessary, it can be given and the excellent results obtained show that such speedy service is not rendered at the expense of careless or mediocre work.

The modern prosthetic department and laboratories have been rearranged to operate in a manner similar to the modern production "assembly lines," and though the processes are highly technical, the skilled technicians work rapidly and without confusion.

Because the hours that a soldier loses from training cannot be made up and time spent waiting for treatment is lost time, the new dental clinics function in a manner which eliminates long periods of waiting. A soldier no longer wastes an entire morning waiting to receive dental care. Except in cases of emergency, he is called in for examination. If possible, he is taken care of immediately; if not, he is given an appointment. He then returns to his unit, where he can assume his regular training duties until the hour of his appointment.

This system works with dual efficiency

From the War Department Bureau of Public Relations, Publications Branch, Washington, D. C.

Fig. 2.—Prosthetic department. Here, time is saved and prostheses made quickly by two devices. In front is the large work bench where the dental officer and his assistant can work without walking into another room. In the background is a window opening into the laboratory. Dentures can be handed through this window to the laboratory workers or be put into the labeled shelves on the side.

Fig. 3.—Oral surgery, exodontia and x-ray sections, under supervision of Maj. Herman Rabinowitz, chief of clinic. Here, diagnosis is made and operations are performed for the preparation of the jaws for dental prosthesis when the teeth cannot be restored by fillings or treatment. Teeth are not extracted if they can possibly be saved.

for, while it saves soldiers' training time, it also saves valuable time for the dental officers, who can now make use of the minutes previously wasted waiting for patients.

To further the saving of time, the

Fig. 4.—Model dental clinic. "Waiting patients" save time for themselves and the dentists here. When the patient in the dental chair is through, one of the seated soldiers will take his place at once. A soldier will then be called from the reception room to take his place as a "waiting patient."

Fig. 5.—Prosthetic laboratory, which is arranged along "assembly line" principles to save time and avoid confusion. Here, highly skilled technicians make the prostheses from lingual bars and clasps to full dentures which are worn by soldiers so that they may chew their food properly and maintain their health. As each technician finishes his piece of work, it is passed to the next man, who performs his particular part of the work and passes it on.

twenty-five-chair dental clinic at Camp Gordon is located conveniently to service about fifty organizations. Comprising five departments besides the administration and receiving office, this clinic has been improved to facilitate the flow

Fig. 6.—Prosthetic laboratory. (Compare Figure 5.)

Fig. 7.—General view of one side of Oliver General Hospital modern dental clinic at Augusta, Ga.

of patients and the filing of records. This saving of time and manpower begins when the patient enters the clinic and reports to the record desk, where a form is made out for him. This record is handed to an assistant in the examination room through a window cut in the wall. The window saves time and unnecessary steps.

In the meantime, the patient is seated in the reception room, where he waits until the examining doctor calls him and diagnoses the condition of his teeth. The work needed is marked on the chart

and the patient either returns to the reception room to await his call to the dental chair for immediate treatment or is given an appointment to come at a future date. In the event an x-ray examination is deemed necessary, it is taken care of immediately. The soldier walks a few steps down the corridor to the x-ray room, where the picture is taken. Films are developed in five minutes and a wet reading shows the condition of the teeth.

Forms indicating what work must be done and that which has been completed are sent to the administration offices, where they are typed and kept on permanent record.

The dental chairs are located in one long room on the second floor of the clinic. Here again a simple device saves much time. While one man is being treated, a "waiting patient" is seated in a designated place near each chair, and as soon as treatment is completed, the waiting patient takes his place in the chair and another "waiting patient" is called from the reception room. This system eliminates the time usually lost

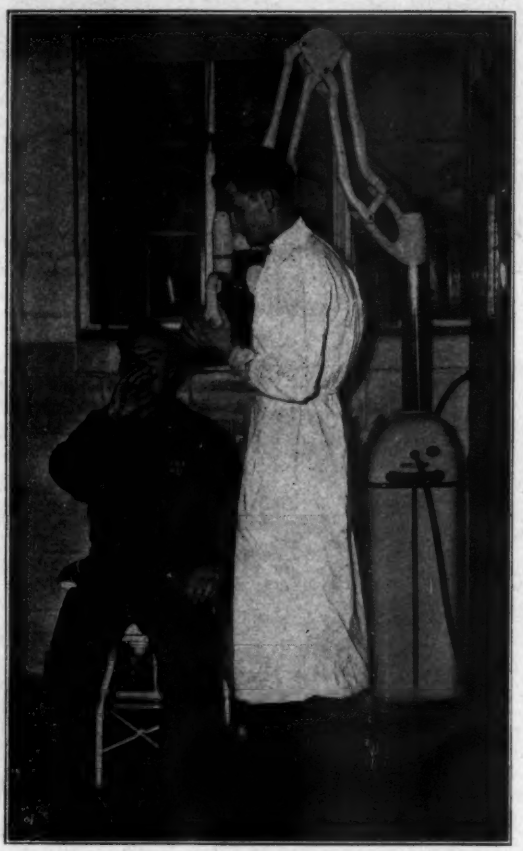

Fig. 8.—X-ray section. Carl V. Wiggins, technician fifth grade, is shown conducting an x-ray examination of a patient's mouth at the Oliver General Hospital, Augusta, Ga.

Fig. 9.—X-ray department of Camp Gordon dental clinic 1-B. In this modern office, x-ray films of the soldier's mouth can be taken in a few minutes. The technician then steps into the dark room and five minutes later has the film developed for a wet reading.

Fig. 10.—Operating room. A complete diagnosis is made of the soldier's teeth when he comes to the dental clinic. He is then asked to remain for immediate attention or is given an appointment to have the needed dental work completed in the near future. The average soldier will have the work done within a week.

in calling the patient from the reception room and awaiting his arrival for treatment. It is carried out in all sections of the clinic.

At the other end of the second floor are the prosthetic department and laboratory. Both of these departments work along the "assembly line" principle. The prosthetic department is that section where teeth are restored. The primary object of the clinic is to provide and maintain a soldier's teeth so that he may chew Army rations. In the event that he has too many teeth missing to chew properly, the dental clinic will replace them. No tooth is ever pulled if it can be saved.

In the prosthetic department, the removal of a wall and construction of a utility work bench afforded more working space. It also minimized the loss of time necessitated in carrying denture cases in process from the laboratory to the prosthetic department. A window opening between the working room and the laboratory and a system of shelves have been found advantageous in the routine handling of denture cases.

A new type bench in the prosthetic laboratory produces systematic and efficient functioning of this department with personnel traffic held to a minimum.

The technicians are seated at their places at the bench in the proper sequence for technical procedures. The dentures in process are passed along the bench, where each technician performs his specialized work, such as the making of clasps or lingual bars or the setting-up of the teeth. Full upper and lower dentures not requiring gold work are passed over that section of the bench directly to the set-up section. The cases are then passed on to another new type processing table, where they are worked upon and passed back to another section for finishing and polishing. The bench is so arranged that the dentures pass around in a circular movement, eliminating many steps and much confusion.

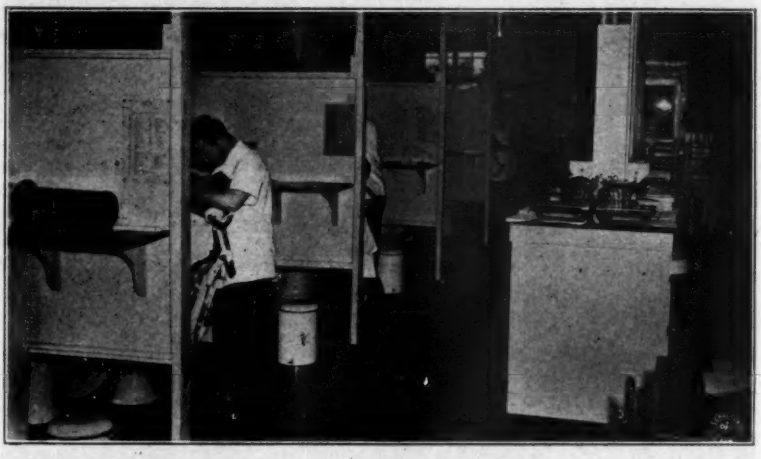

Fig. 11.—Oral surgery department, Oliver General Hospital, Augusta, Ga. Capt. A. E. Plahy examines a patient whose jaw has been fractured in combat.

The enlisted men who work in the prosthetic laboratory are for the most part men who had not worked in a laboratory prior to their service in the Army. In most instances, they received their training as technicians at Lawson General Hospital, Atlanta, Ga.

According to Maj. Herman Rabinowitz, chief of the Camp Gordon clinic, the "model" system has been functioning for several months and has proved itself

to have marked advantages over the ordinary set-up. He says, too, "The clinic was constructed along these principles for the purpose of conserving man power, upholding a level of production and maintaining the highest standards of quality in all departments."

The "model" dental clinic at Oliver General Hospital is under Col. Tyler J. Walker, chief of the dental service at the hospital.

For the month of January at Camp Gordon, more teeth were replaced than extracted. The figures show 1,583 extractions and 4,177 replacements. Statistics for Camp Gordon during 1943 are as follows: routine cases, 39,972; emergencies, 4,699; sittings, 122,047; permanent fillings, 96,635; full dentures, 913; partial dentures, 2,731; fracture cases, 15; extractions, 34,676.

The 1943 figures from Oliver General hospital are: dental treatments, 12,412; fillings, 10,551; extractions, 1,432; bridges and dentures, 439.

SODIUM FLUORIDE MOUTH RINSE: REPORT OF TWO CASES

SIDNEY EPSTEIN, D.D.S., and HARVEY M. SCHAMP, Ph.D., San Francisco, Calif.

A DENTAL student conceived the idea of using a mouth rinse of 1:1,000 sodium fluoride after he had read Bibby's article on the possibility of preventing or diminishing the caries incidence.[1] He purchased the fluoride in a drug store and made his own solution. In addition to using the preparation "about once a week for four or five minutes," he convinced his wife of its merits and she also used it. They had been using the solution about six months when they first came under observation.

REPORT OF CASES

CASE 1.—W. F., a man, aged 31, of German ancestry, had good health, although the dental history was a long one. Direct observation of the teeth revealed nothing significant. There was some salivary calculus. Some carious areas had been restored before the use of fluoride was begun and the mandibular first molars were extracted. There was some hypersensitivity at the cemento-enamel junction. The gingival crests showed a little irritation, but this could be attributed to faulty toothbrush technic. At the time that the cavities were filled, that is before fluoride was used, an unusual amount of secondary dentin was noted. The two roentgenograms (Fig. 1) showed no change in the size of the pulp chambers or any arrest of caries during the period that fluoride was used. The different densities of the roentgenograms prevented accurate comparisons, but it was apparent that there were no great alterations in bone structure as yet.

CASE 2.—Mrs. W. F., aged 24, of Scotch-Irish and Dutch ancestry, had teeth that were in fairly good condition. There were about twelve simple fillings in the posterior teeth, many of these in pits and fissures. The gingivae were firm and healthy and of good color. The mouth hygiene was good. The two roentgenograms (Fig. 2) showed no apparent changes in bone or pulp chambers. Carious areas that were not restored showed progressive increase in decay, indi-

From the Department of Physiological Sciences, College of Physicians and Surgeons of San Francisco.

1. BIBBY, B. G.: *Tufts D. Outlook*, 15:4, May 1942.

cating that there had been no arrest of caries. However, there had been no new carious lesions since the patient had started to use fluoride.

Both patients were vegetarians, maintaining adequately balanced diets consisting of raw and cooked vegetables, nuts and dairy products. Examination of the dietary history showed a minimum consumption of refined carbohydrates and cereals. This point is of interest in view of the number of restorations and carious areas (untreated) despite diet, good mouth hygiene and the use of sodium fluoride solution.

Fig. 1 (Case 1).—Condition (left) January 8, 1943, before use of fluoride mouth rinse; and (right) October 10, 1943, after use of fluoride mouth rinse for six months.

Fig. 2 (Case 2).—Condition (left) January 8, 1943, and (right) October 10, 1943.

There has been no attempt to relate any of these observations to the use of fluoride solution in a cause-and-effect relationship, but the significance of the cases lies in the fact that the gingivae appear to be nearly normal, or at least not unduly irritated even though they have been in contact with the fluoride solution four or five minutes each week. If more such experimental cases could be found, a greater field for application of the technic of caries prevention suggested by Bibby could be opened. Whether the use of fluorides in mouth rinses has any merit was not indicated by these cases. It should be noted, however, that the child patients of Bibby underwent thorough prophylaxis every four months, and that, in each case, prophylaxis was performed just before the application of the fluoride solution. In this respect, these two cases differ from those in Bibby's series.

RELATIONSHIP BETWEEN GINGIVITIS AND PENICILLIN ADMINISTRATION

PRELIMINARY REPORT

ALVIN E. STROCK,* D.M.D., Staten Island, N. Y.

AN apparent relationship between the condition of the gingivae and penicillin administration has been observed.

In view of the effectiveness of penicillin against the spirochete of syphilis, and considering the alleged rôle of certain oral spirochetes in some disturbances of the mouth, oral examinations were made of patients receiving penicillin. It was noted that 198 patients were treated with from 80,000 to 9,000,000 units of penicillin for various pathologic conditions, among which were gonorrhea, syphilis, osteomyelitis, septicemia, subacute bacterial endocarditis and brain abscesses. In all of the cases, the gingivae were remarkable in tone and free from inflammation despite a history in thirty-seven instances of ulceration and spontaneous bleeding at the time penicillin treatment was begun, or a history of bleeding gums for which treatment had been sought within three months prior to penicillin therapy.

Fully appreciating the importance of, and not seeking a complete substitution of, local measures of oral hygiene in the treatment of gingivitis, and aware of profound underlying factors in some forms of this disturbance, an attempt to verify this influence of penicillin under controlled conditions was made in a study of fifteen patients with ulceromembranous gingivitis (Vincent's infection) for which penicillin administration was the only form of therapy. All patients were male, aged 18 to 50. Neither toothbrushing, mouth irrigations, nor oral hygienic measures of any kind were allowed. No special diets were prescribed. Unlimited smoking was permitted. The cardinal signs of inflammation, ulceration, with a raw bleeding surface on removal of the pseudomembrane, inverted papillae, accumulated detritus, pain, temperature elevation and malaise, were present.

Of the group studied, two patients, in addition to the gingival involvement, had acute alveolar abscesses; one patient, tuberculous, had skin lesions corresponding to those of *erythema multiforme;* two patients had gingival ulceration superimposed on bismuth stomatitis; one patient had dermatophytosis, and four patients had ulceration involving the cheeks and throat. One patient had been unsuccessfully treated for necrotic gingivitis for several days prior to penicillin therapy.

One variable factor was present in five patients who changed from their outpatient diet to the regular hospital fare. These patients were watched for a limited time to be certain that recovery would not come about at once spontaneously.

Penicillin was administered in varying amounts from 1,250,000 units intramuscularly to 5,000 units placed into the mouth and held at rest for lengths of time ranging from one hour to continu-

U. S. Public Health Service, U. S. Marine Hospital, Staten Island, New York.

ous bathing except during eating and sleeping periods.

In all cases, there was prompt improvement. The pattern seemed to be one of relief from subjective symptoms within the first twenty-four hours, with obvious clinical changes from then on until healing was complete. No case failed to show definite favorable changes in the gingivae following penicillin administration.

Initially, penicillin therapy was continued until repair was complete. It was soon learned, however, that, after the early changes, healing progressed despite the withdrawal of the penicillin. Notwithstanding the complete absence of local hygienic measures, the teeth were remarkably free of débris during the time the penicillin was given, and some cases, especially those receiving penicillin intramuscularly, except for calcareous deposits, suggested that local measures of oral hygiene had been administered.

Both cases of alveolar abscess subsided at once. One recurred two weeks after penicillin therapy was discontinued, the offending teeth having been left in place in both cases for that length of time. The dermatophytosis improved markedly within forty-eight hours, and the skin lesions of the tuberculous patient, which it was said previously resembled those of *erythema multiforme,* cleared up within seventy-two hours except for the marks where the lesions had been. In the two patients requiring bismuth therapy, this was continued without further ill effect despite the absence of all local oral hygiene.

The impression was gained in all cases that the penicillin gave impetus to a healing process that was unusually rapid, as though its beneficial effect was being exerted directly on the tissue, promoting the speed of tissue regeneration and epithelization.

The number of oral spirochetes and fusiform bacilli decreased rapidly and in some cases the organisms could not be recovered at all after short periods of treatment.

A more detailed presentation of this brief report is planned which will include the microscopic studies.

SUMMARY

Penicillin apparently has a beneficial effect on the gingival tissues. It seems to impart to them better tone, less tendency to bleed readily and a remarkable healing quality. This occurs in the presence of very unfavorable local conditions. The mechanism for this is unknown. This effect can be observed when penicillin is used intramuscularly or locally. Method of administration of choice and optional dosage are yet to be established.

In view of the great potential influence of penicillin on dental health, further studies, which will be reported, are being carried on.

THE JOURNAL *of the*
AMERICAN DENTAL ASSOCIATION

L. PIERCE ANTHONY, D.D.S., Editor

Published by the American Dental Association
222 East Superior St., Chicago, 11, Ill.

All expressions of opinions and all statements of supposed facts are published on the authority of the writer over whose signature they appear, and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association.

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Subscription is included in the annual membership dues. The subscription rate to non-members is $5.00 a year in advance, this rate applying to both domestic and foreign subscriptions. All foreign subscriptions are to be paid in United States money.

SEPTEMBER 1 *Editorial Department* 1944

POSTWAR REFRESHER EDUCATION

IN the light of the recent turn of events in the various theaters of war, it is evident that postwar planning in the dental, as well as in all other fields of health activity, is entirely in order at the present time; although no one can say exactly when the result of such planning can be put into actual practice. When that time does come, as the result of victory of the Allied armies, one of the most difficult problems the dental profession will have to meet will be ample provision for refresher educational courses so that those now in the service may rehabilitate themselves educationally, as it were, for civilian dental practice.

So far as emergency war measures in the clinical aspects of war dentistry are concerned, most of the men in service will be far in advance of the civilian practitioner, but there will be many who will wish to pursue postgraduate work, refresher courses or study club courses to review the advances made in civilian dental practice while they were occupied with war emergency practice. Among the many obligations that those who have not been called into service will owe to those who entered the service will be to provide ample facilities for postgraduate work and educational refresher courses.

Many of the men now in the service will not have had the benefits of

the experience of private practice; many of them will not have made provision for entering private practice, having been more or less hurriedly drafted into Army service; many of them will remain in the Army service, and many who engaged in general practice before entering the service will wish to qualify for the various special phases of civilian practice. Also, there will be those who were drafted from special practice who will wish to reenter general practice.

A goodly number of these men, in fact the majority of them, have given up lucrative practices to answer the call of patriotic duty—and without the prospect of resuming lucrative practice when discharged from Army service. They are the men to whom those who remained at home owe an obligation that can be discharged only by an all-out effort to aid them in reestablishment in practices under conditions comparable to those which they sacrificed to serve the Government.

It has long been recognized in the dental profession that the practitioner is notably lax in pursuing postgraduate study in the effort to keep pace with dental educational advancement; so much so, that only about half the dental schools offer postgraduate work to their graduates. We are glad to note, however, that the mental attitude toward follow-up dental education on the part of the profession generally has changed materially in the last few years, and that increasing attention is being given to refresher courses designed to keep the dentist in close touch with the newest advances in dental practice.

Educating the novitiate in the necessity of keeping pace with professional advances after he has completed his educational preparation and entered practice is a subject that has been much neglected in the past, but one that is attracting increasing attention and quite fittingly so in view of the many who will soon need such service. This conspicuous shortcoming in dental practice can, we believe, be remedied quite satisfactorily with the promotion of study clubs, postgraduate study and refresher courses.

If there has been need for refresher courses in so-called normal times, and there most certainly has been, how much greater will be the need for such courses at a time when a large proportion of the profession has been out of touch with actual practice and with scant means of keeping pace with the advancing steps.

The broadening scope of dental practice, with its closer association with diseases that involve the system generally, demands that the dentist keep well informed on these relations and equipped to do his part in

collaborative treatment of oral conditions which express themselves systemically.

We would not discount the educational value of the experience which the men in the Dental Corps have received and are now receiving, but we submit that the exigencies of dentistry in the armed forces are hardly conducive to fitting the recipient for private dental practice.

That the profession is aware of the need for a concerted effort on behalf of the men who have been divorced from private practice is evidenced by the fact that the Council on Dental Education of the American Dental Association has appointed a Committee on Postwar Educational Planning which is studying the problems here under discussion. This Committee is preparing a questionnaire to be sent to all dentists in the armed forces asking an expression of their desires and ambitions for the postwar era, with a view to making proper provision for the educational needs of these men, in the nature of postgraduate work, study clubs and refresher courses.

The War Service Committee is also giving consideration to the disposition of surplus dental materials and supplies of the armed forces, in an effort to make them available to dentists leaving the service. This committee is in close touch with the Military Affairs Committee of the United States Senate and hopes to be of material aid to those men who went direct from school into the Dental Corps. They also hope to be of material help to the men who disposed of their equipment and practice to enter the service.

We add the foregoing note of encouragement for a number of men in the service who have expressed the thought that they in their present predicament have been forgotten by the American Dental Association.

While it is quite likely that our teaching institutions will provide educational facilities to meet the desires of their students, it is hopefully suggested that dental societies in small communities and those out of touch with teaching institutions offer refresher courses and study club facilities to their members.

The organized dental society can do much in respect to promoting refresher courses, and such effort is really within the scope of the purposes and obligations of the dental society. Dentistry as a profession owes its very inception to the general realization of the broad principle of cooperation, helpfulness and exchange of knowledge and experience as embodied in the motives and objectives of the organized dental society. The establishment of such a medium of helpfulness as the refresher

course or study club will enable the dental society to answer the often-asked question as to what the dental society does for the average member. Of the many benefits that come from the organized society, one of the most tangible is the opportunity which the society affords to members to keep abreast of the advancement and progress in all phases of dental practice.

The schools, having been deprived by the Government of sources of students, will in all probability have all the facilities necessary for post-graduate, graduate and refresher courses and will in all likelihood welcome this opportunity to employ to the full their educational equipment and facilities.

There is one phase of dental educational "rehabilitation" that may cause embarrassment and be a handicap to some of those needing this postwar educational opportunity, and that is the expense of such work to men who have no other resources than those provided to them by the Army. However, it may be possible to induce the Government to appropriate funds for such educational rehabilitation, and the Committee of the Educational Council and also the War Service Committee have in projection plans for use of such funds if available. The Government appropriated some $200,000 in 1943 for aid in relocation of dentists in areas where there was a shortage of dentists in civilian practice, and we anticipate more extensive use of such funds, if made available, than was necessary in the relocation of civilian dentists.

It is sincerely hoped that the governmental authorities will see fit to provide some such facilities as those above noted in an effort to ameliorate some of the annoyances and reduce the handicaps imposed by the frustration of the dental educational program.

BIBLIOGRAPHICAL

The Art and Science of Nutrition

By ESTELLE E. HAWLEY, Ph.D., and GRACE CARDER, B.S., of the University of Rochester, School of Medicine and Dentistry, Strong Memorial and Rochester Municipal Hospitals, Rochester, N. Y. 669 pages and 139 illustrations including 11 in color. Second edition. Price $3.75. St. Louis: C. V. Mosby Co., 1944.

THE theories and application of the art and science of nutrition are thoroughly discussed in this textbook on dietetics. The subject matter is well organized and the authors have divided the book into six parts. Part one includes a terse consideration of normal nutrition, digestion, metabolism and the various types of foods. Part two deals with food requirements in special conditions such as pregnancy, lactation, infancy, childhood and old age. Eight pages are devoted

to a brief summary of the relationship between diet and the teeth.

In part three, the authors give general suggestions concerning diet therapy in diabetes mellitus, fevers, diseases of the liver and gallbladder, celiac disease, gastrointestinal disorders, anemia, etc. Part four is devoted to the detailed discussion of the choice, preparation and serving of food. A thorough outline of a course in dietetics is included.

Fifteen pages of bibliographic references make up part five, and part six includes 125 pages of tables and charts giving the composition of and caloric value of foods.

This work is designed as a textbook for nurses, but is a comprehensive presentation of the subject of nutrition, which can be recommended to any one interested in the fundamentals of dietetics.

M. K. H.

Atlas of the Mouth

By MAURY MASSLER, D.D.S., M.S., Director of the Child Research Clinic, Assistant Professor of Histology and Lecturer in Stomatology (College of Medicine), and ISAAC SCHOUR, D.D.S., Ph.D., D.Sc., Professor of Histology and Head of the Department of Histology of the University of Illinois, College of Dentistry. 180 illustrations, 19 in color, prepared by Carl T. Linden. Published and distributed by the Bureau of Public Relations of the Council on Dental Health of the American Dental Association. Price $2.50. 1944.

ALL dentists who have not yet purchased a copy of this excellent new "Atlas of the Mouth in Health and Disease" should do so at once. The book consists of a carefully prepared series of illustrations with terse explanatory comments and is an invaluable aid in the study of the mouth and adjacent structures. The drawings, which are the most prominent part of the atlas, are accurate, clearly drawn and well reproduced.

Various aspects of the normal oral structures of the oral cavity and common involvements are illustrated and discussed. Notable among the wide variety of subjects considered are the treatment of fractures, the anatomy of the head and neck, the progress of periodontal disease, dental caries, enamel hypoplasia, the salivary glands and lesions of the tongue.

Teachers will want to refer their pupils to the book and dentists can use it for study and in discussions with their patients. Certain of the plates are not technical, but the information presented is authentic and detailed. One or two key bibliographic references are given on each subject.

This book "must be seen to be appreciated," and, at its modest price, represents one of the book bargains of the year.

M. K. H.

Textbook of Sterilization

By WEEDEN B. UNDERWOOD, B.S., in E. E., Director of Research, American Sterilizer Company. Revised edition. 1941. 172 pages and 103 illustrations. Chicago: The Lakeside Press.

IT IS taken for granted today that every one knows the importance of adequate sterilization in medicine and dentistry, yet actually there are few scientific data on sterilization technic. This book is designed to serve as a text or reference on sterilization.

The author points out that it is well for every individual interested in surgery to read thoughtfully the experiences of the early surgeons whose death rate ran as high as from 60 to 80 per cent, and to realize the rôle sterilization has played in making surgery and hospitalization safe. We know now how to destroy the most resistant of pathogenic organisms and spores, simply and positively, if adequate equipment and knowledge is used. This book discusses both the theory and the practical aspects of sterilization.

Sterilization by steam, hot air and boiling are discussed. Chemical or "cold" sterilization is not considered. This book is detailed, comprehensive, scientific in its approach and easy to read. It can be recommended to any one interested in sterilization of instruments and materials used in surgery.

M. K. H.

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Meeting of the House of Delegates

OCTOBER 16, 17 and 18, 1944
CHICAGO, ILL.

The opening session of the House of Delegates will convene at 10 a.m., Monday, October 16. The second session will be held at 2 p.m., Monday, October 16; the third session at 2 p.m., Tuesday, October 17, and the fourth session at 1 p.m., Wednesday, October 18.

The four sessions of the House of Delegates will be held in the North Ball Room, Third Floor, Stevens Hotel.

The Credentials Committee will register Delegates and Alternates beginning 10 a.m., Sunday, October 15, at the Stevens Hotel.

Reservations should be made direct with the hotel.

HARRY B. PINNEY, Secretary

COUNCIL ON DENTAL THERAPEUTICS

ANESTHETICS IN DENTAL PRACTICE

WILLIAM NEFF,* M.D., San Francisco, California

WITHOUT lying do not speak the whole truth; there is nothing that requires more careful handling than the truth . . . not all truths may be spoken, because some matter to us, and some matter to others.—Gracian (1653).

As if in strict compliance with Gracian's advice, all anesthetic agents and nearly all methods for their administration have been recommended to the dental profession without any reference to the qualifications of the anesthetist. The failure of authorities in the field of anesthesiology to base their recommendations regarding anesthesia for general or dental surgery more upon the administrator's training and experience than upon the contemplated operative procedure has been unfortunate.

The dentist alone has received scientific and clinical training in anesthesia which is comparable with, and in some instances superior to, the instructions in this subject given by the medical schools.

The dentist who administers the occasional anesthetic will do well to associate himself with time-tested anesthetic agents and simple methods rather than to attempt complicated procedures with unfamiliar drugs.

DENTISTS AND ANESTHETICS

A classification which places the dentist in a realistic rather than a historical relationship to the administration of anesthetics appears desirable. Accordingly, it is suggested that all dentists automatically fall into one or more of the following three groups depending on their nearness to or remoteness from the actual administration of anesthetics.

Group 1. Dentists who administer their own anesthetics.

Group 2. Dentists who administer anesthetics for other dentists.

Group 3. Dentists who engage physician anesthetists.

Group 1 is by far the largest because it accounts for all the local and regional anesthetics administered in the practice of dentistry. In addition, general anesthetics not actually administered by the dentist, but for the conduct of which he is legally responsible, fall into this category. Consequently, all anesthetics administered by an office girl, hygienist or nurse, for whose actions the dentist must assume full legal responsibility, will be considered as having been administered by the dentist.

Group 2 is composed of a small, but active component of the dental profession who have developed anesthesia for dental operations into a specialty. The administration of anesthetics by dentists for dentists shifts the responsibility for the conduct of the anesthesia from the dental surgeon to the dental anesthetist.

Group 3 consists of dentists who engage physician specialists for the administration of anesthetics. While this group is largely limited to oral surgeons,

From the Department of Surgery (Anesthesia), Stanford University School of Medicine.

*Associate clinical professor of surgery (anesthesia), Stanford University School of Medicine, and chief anesthetist, Stanford Hospitals.

whose operations are performed in the hospital, such is not always the case. In certain cities, and in Canada, it is the custom for the physician anesthetist to administer anesthetics in the dentist's office at a time when the hospital operating theaters are not busy, usually in the afternoon.

The foregoing classification has been formulated with the realization that the dentist may find himself in one group under certain conditions and in another group under others. To illustrate, a dentist might do all his own local or regional nerve blocking, yet engage a dentist or a physician to administer general anesthetics to his patients.

Certain anesthetics and technics which might be recommended for the use of dentists in Group 2 or 3 would be entirely unsafe in the hands of those in Group 1. It is to the latter group of dentists, who administer their own anesthetics, that the following recommendations and precautions are primarily directed. All dentists and physicians who have even a remote connection with the administration of anesthetics will profit by reading the chapters on the "Principles of Inhalation Anesthesia," by M. B. Seevers, and "Local Anesthesia," by M. L. Tainter, in "Dental Science and Dental Art."

SELECTION OF A SUITABLE TECHNIC

Regional Anesthesia.—Regional anesthesia is perhaps nowhere so successful as in the blocking of the various branches of the trigeminal nerve, incident to dental surgery. The dentist who perfects himself in the technic of depositing small amounts of a local anesthetic solution in proximity to the nerve holds a distinct advantage over his colleague who depends on a larger amount of the anesthetic solution less exactly placed and more generally distributed.

Many dentists are skilful enough to carry on an extensive practice with only occasional recourse to general anesthesia. Others report thousands of cases of general anesthesia. It would appear that when the dentist gives his own anesthetics, he will do well to restrict himself to those procedures over which he has the greatest control. From the standpoint of safety to the patient, regional anesthesia will stand foremost, inhalation anesthesia as less safe, while intravenous and rectal anesthesias, being least controllable, will prove most hazardous.

Inhalation Anesthesia.—The inhalation anesthetics which the dentist, acting as his own anesthetist, may more safely administer are nitrous oxide, with an abundance of oxygen and ethyl ether. The use of nitrous oxide and oxygen self-administered by the patient, under the direct supervision of the dentist, to produce relief of pain without loss of consciousness is a procedure that can be highly recommended. Analgesia so effected has given great comfort to many patients during the preparation of teeth for fillings and other procedures less painful than extraction.

Nitrous oxide, with a complement of oxygen not below that contained in the air, is the least toxic general anesthetic agent known. Unfortunately, it is also the least potent. Many vigorous subjects will fail to be anesthetized with this combination, requiring some form of preliminary sedation or the addition of a more potent anesthetic, or both. Anesthesia may, however, be deepened by restricting the oxygen. This method, in the light of our present knowledge regarding the immediate and latent damage to the nervous system which accompanies oxygen lack, should be roundly condemned. Many manifestations of cortical nervous system damage cannot be readily detected. The anesthetist who increases the depth of anesthesia by restriction of oxygen and claims freedom from complications with such a technic is in great error. Some impairment of the ability to think or

to use the special senses may be detected only after the patient has left the dentist's office "fully recovered." It is to be hoped that the dentist will refrain from restricting oxygen to attain increased depth of narcosis even though he "knows" he "can get away with it." The anesthetic most safely employed to fortify nitrous oxide anesthesia is ethyl ether.

ETHER IN RETROSPECT

The history of ether anesthesia gives the lie to those who would have us associate its induction period with sensations of suffocation or choking, and its recovery period with nausea and vomiting. If such were the facts, the discovery of the anesthetic properties of ether might have been long delayed. One has only to recall that, before its use as an anesthetic, ether was administered for the purpose of producing a state of exhilaration and a general feeling of well being. Are we to believe that the drug which was at one time associated with mirth and euphoria can now be associated only with unpleasant sensations? The reasons for such a change could conceivably be related to only two circumstances. First, the preparation of ether might at present be different, or, secondly, the manner of administration might be altered. It may be stated with reasonable assurance that the increased purity of ether has acted only to reduce the incidence of unpleasant side actions. The "horror of ether" anesthesia may more satisfactorily be explained by a faulty manner of administration.

The patient who is given ethyl ether to fortify nitrous oxide anesthesia will not have a greater tendency to vomit postoperatively than when anesthesia of comparable depth has been produced by other agents. Failure to pack the mouth properly during the operation or to recover blood and débris completely by suction immediately after frequently results in vomiting regardless of the anesthetic agent employed. Patients with food in the stomach before the induction of anesthesia will be inclined to vomit. Vomiting induced by the presence of food or blood in the stomach is unlikely to be persistent. Vomiting incidental to restriction of oxygen during the administration of any anesthetic may persist for days.

OTHER GENERAL ANESTHETIC AGENTS

It is obvious that when a dentist acts as his own anesthetist, his attention is divided between the administration of the anesthetic and the conduct of the operation. The anesthetics that offer the greatest safety to the patient under such circumstances are nitrous oxide with a high complement of oxygen and ether.

The use of such agents as ethyl chloride, chloroform or trichlorethylene under conditions of divided attention presents even greater hazards than its well-known toxic effects on the heart and liver suggest. The use of these agents in dentistry is definitely undesirable.

Divinyl ether, or vinethene, may be considered in the same category as, but somewhat less toxic than, chloroform. Divinyl ether, in common with ethyl ether, is explosive when vaporized with air or when added to a mixture of nitrous oxide and oxygen.

Ethylene may be substituted for nitrous oxide and a slightly more profound depth of narcosis be obtained. It is not suitable for self-administration for analgesia. Unlike nitrous oxide, it is inflammable and explosive and, therefore, much more hazardous.

Cyclopropane* should be restricted to the use of physicians or dentists who limit their practice to anesthesiology. Its employment in dentistry can be properly accomplished only by means of the completely closed carbon dioxide technic. The system can only be considered completely closed when a snug-fitted endotracheal tube has been introduced and

*Not accepted by the Council on Dental Therapeutics.

connected by leak-proof connections to a suitable anesthetic machine.

Intravenous anesthesia, with the ultrarapidly acting barbiturates such as evipal† or pentothal,† should likewise be administered only by a physician or a dentist properly qualified and not by nurses or other lay personnel acting as the dentist's agent. Even when a specialist in anesthesia has administered an intravenous anesthetic, the patient, although he has apparently fully recovered his faculties, should not be permitted to return home unaccompanied. Periods of amnesia are common after apparent complete recovery from the anesthesia, and the danger that the unaccompanied patient may be involved in a traffic accident is ever present. Intravenous anesthesia presents a special hazard not present in inhalation anesthesia; that is, the irretrievability of the injected agent, an insurmountable situation in case of a serious reaction or collapse. All in all, intravenous anesthesia is undesirable in general dental practice.

PREANESTHETIC SEDATION

The use of the barbiturates should perhaps be made a routine procedure before local or regional anesthesia. However, one must consider the possibility that the patient may be unduly depressed by even a moderate dose of a rapidly acting barbiturate such as pentobarbital sodium. Such an individual might endanger himself if allowed to leave the office, unaccompanied, in a semidrunken stupor.

The hypodermic administration of atropine before general anesthesia in office practice is preferable to the use of barbiturates. Reduction of salivary secretions is especially desirable if ether is employed. The freedom from psychic depression renders the complete recovery of mental faculties more prompt than when psychic sedative drugs, such as the barbiturates or scopolamine, are used.

The dentist acting as his own anesthetist should avoid the use of any intravenous sedation with such drugs as morphine or the very rapidly acting barbiturates.

REACTIONS TO SOLUTIONS OF LOCAL ANESTHETICS

Much has been written about the use of the barbiturates to prevent the toxic effects of local anesthetic agents, but there is one point upon which many physicians and dentists are somewhat confused. The toxicity referred to has to do with the production of convulsions by local anesthesia and not with the circulatory and respiratory depression which occasionally follows it. The small amount of the local anesthetic required for nerve blocking plus the fact that epinephrine is, as a rule, incorporated in the solution lessens the likelihood of circulatory depression from use of the anesthetic drug.

Untoward actions following the administration of the small amount of procaine solution required to block the maxillary or mandibular nerves can almost invariably be traced to the vasoconstrictor contained therein. Reactions may give the administrator considerable worry, especially if the patient has some degree of hyperthyroidism. Clinically, such individuals exhibit pallor, sweating, consciousness of heart action, apprehensiveness and an increase in the pulse rate. The blood pressure may be unchanged, slightly depressed or even elevated.

The dentist should remember that a patient who is by nature easily excited will tend to become more so under the influence of injection of an anesthetic containing a vasoconstrictor. The psychic factor is important and indeed may be the sole cause of an untoward reaction,

†Not accepted by the Council on Dental Therapeutics. Evipal and pentothal have not been found safe or useful in the general practice of dentistry.

but usually it is precipitated by the systemic action of a vasoconstrictor.

The patient who has received an overdose of a local anesthetic agent presents a similar symptom complex, nearly always accompanied by a slow pulse rate and greatly reduced blood pressure. The appearance of convulsions is rare after injection of a small amount of anesthetic solution containing epinephrine in the strength used for dental anesthesia. Procaine remains the most generally useful local anesthetic for injection, and the least toxic. The incidence and severity of untoward reactions from the use of of a local anesthetic agent are greater with the more toxic drugs.

TREATMENT

Preventive.—The patient who is accustomed to drinking alcoholic beverages should be instructed to take a drink before appearing for his dental appointment. Other nervous individuals may be given a barbiturate preoperatively, provided they will be accompanied by another person on leaving the office.

Restorative.—Lowering the patient's head will restore the cerebral circulation so that he will have almost immediate relief from the sensations of dizziness and impending syncope. This having been done, a brief explanation of the phenomena to the patient, plus the assurance that the effect is fleeting, will serve to give him confidence and permit resumption of the operation. If oxygen is available, the inhalation of a few deep breaths of it will hasten recovery. In its absence, the simple advice to the patient to take several deep breaths of air affords a satisfactory substitute. In any emergency, the first thought should be directed toward the maintenance of adequate pulmonary ventilation, the anesthetist remembering always that inflation of the patient's lungs by the prompt application of mouth to mouth artificial respiration may save a life.

SUMMARY

1. A classification of anesthetists presented considers the relationship between the dentist and the administration of anesthetics.

2. Recommendations for dentists who give their own anesthetics include a reaffirmation of the safety record of procaine, nitrous oxide with atmospheric proportions of oxygen and ether, as compared with other anesthetic agents and routes of administration.

3. The untoward reactions to local anesthetic agents and pressor substances are to be considered. Simple measures are often effective for the prevention and treatment of complications resulting from the administration of anesthetics.

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BUREAU OF PUBLIC RELATIONS

SUGGESTIONS FOR A DENTAL SOCIETY PUBLIC RELATIONS PROGRAM

LON W. MORREY, D.D.S., Chicago, Ill.

INTRODUCTION

THE Constitution and By-Laws of the American Dental Association state that one of the purposes of the Association is to disseminate knowledge of dentistry and dental research in order to inform and educate the public in regard to oral hygiene and dental prophlaxis and to advance scientific dental service.

The Association has long recognized this obligation and, for years, through the Bureau of Public Relations, in cooperation with its Committee on Public Health and Education and, more recently, through its newly created Council on Dental Health, it has used every available means to bring the message of dental health to the American people.

Most state and component dental societies, like the A.D.A. itself, are interested in the relationship of the members of the dental profession to their communities. Therefore, this Bureau, with the assistance of its public relations council, has prepared the following suggestions, which it is hoped will prove helpful in dental society public relations activities.

I

PUBLIC RELATIONS AND PUBLICITY

The purposes of a dental public relations program for a state or component dental society are threefold:

1. To educate the public in care of the teeth.

2. To keep the dental society in the forefront of its community's civic and health endeavors by cooperative efforts with other public, professional and lay organizations.

3. To advance the public's regard for the services of dentistry and to attract the highest type of young men and women to the profession.

To put it concisely, the purpose of a public relations program is "to make friends and influence people."

Dental public relations cannot be the responsibility of any one committee of the dental society, but should be the concern of all. Dental society activities should be governed by a public relations program because the progress of the profession depends on the public opinion of it.

Dental public relations consists of three parts:

1. A constructive policy. The dental society as a society must think in terms of public benefit first.

2. Sound performance. The dental society must not only think rightly, but also perform rightly. It must translate its policies into service for the community.

3. Public information service. Publicity—the printed and spoken word—is the handmaiden of public relations. A successful public relations program integrates publicity with its activities so that publicity may always serve the ends of public relations endeavors. Authentic information cannot be released to the public until action within the profession has taken place. The deed must precede the word.

II

ORGANIZATION

The most effective organizational method is selection of a public relations committee large enough to include members to be assigned to public relations tasks exclusively and others to publicity tasks exclusively with all endeavors integrated by the chairman.

A major factor in any public relations program is the choice of men and women who constitute the committee. The members of this committee should be selected carefully. They should be able to make personal contacts with newspaper editors and reporters, radio station officials and civic, public health and school officials. At least one member should be chosen for his ability to prepare stories for newspapers and scripts for radio and to assist in preparation of speeches. In most dental societies, it will be found that certain members have a natural aptitude for one or more of these assignments.

When funds permit, the services of a professional publicity agency are desirable. Such an agency may be retained on a year-round basis (preferred) or may be secured for a specific meeting or special event. All releases and activities of an agency should, of course, receive prior approval of the committee or its chairman.

III

SPECIFIC PROJECTS

To be most effective, the dental society's public relations program must be carefully planned and executed so that, in a given period, its activities will cover the three general public relations purposes set forth in Section I. It is important that the purpose behind every project undertaken shall be not merely "having something in the paper" or "showing activity," but to carry to the public a worth-while dental message.

PUBLIC RELATION PURPOSES AND METHODS BY WHICH THEY MAY BE IMPLEMENTED

1. Education of the public regarding mouth health.

A. News releases to daily and weekly newspapers on some phase of dentistry and dental care. At least one release of this type is furnished each month in the *A.D.A. Public Relations Bulletin*. Whereever possible, it is suggested that dental educational news releases of a general nature be released under the byline of the state or local health department, board of education or some other recognized or reputable organization as an effective way of supplementing the releases of the dental society. News stories dealing specifically with the activities of the dental society must, of course, emanate from the society itself.

B. Timely releases to industrial house organs and publications of civic, school and special interest (PTA, fraternal organizations, etc.) groups. The A.D.A. Bureau of Public Relations monthly bulletin releases frequently fall within this category. In addition, editors of these publications should be contacted to develop articles for their exclusive use which tie in definitely with the group's own endeavors and interests.

C. Lectures by society officers before club meetings, civic organizations, school assemblies, etc. Local dental societies can sponsor lectures on interesting dental topics for laymen. Held in a public place with invitations extended to all the people in the community, these lectures can do much to make the public increasingly interested in dental health. The Bureau of Public Relations has available a number of lectures, many with illustrative slides and motion pictures. Such lectures should furnish good material for newspaper stories.

D. Radio addresses by society officers. The A.D.A. Bureau of Public Relations has available several radio series, special radio talks and electrical transcripts.

E. Dental health exhibits. The annual

meeting of a state or component dental society should feature, whenever possible, a hall of exhibits, which should be publicized as a front-rank community educational project.

F. "Your Dental I.Q." For several years, the Public Relations Bureau of the A.D.A. has prepared an attractive, illustrated newspaper series, consisting of questions and answers in the layman's language. The Bureau has asked the cooperation of the component societies to arrange for the publication of this feature in their local press. This series has proved successful in arousing reader interest wherever it appears.

G. Special events conducted by the society. In the past, many state and component societies have quite successfully brought home the dental health message to school children through sponsorship of dental health poster and essay contests. Naturally, projects of this kind must be developed with the cooperation of local school authorities so that the community's accepted educational practices may be maintained.

H. Dental health "days" or "weeks," which some societies have popularized. Usually, these are more effective from a publicity than from an educational standpoint. However, they can be used as a vehicle to help put across needed dental messages.

2. Maintenance of Dentistry's position in public and community affairs.

A. State societies should work very closely, in an advisory capacity, with the dental units of the state health departments, and with the state departments of education. Component societies should cooperate as closely as possible with local boards of health and boards of education.

B. Active participation in the Parent-Teacher Association's annual Summer Roundup of the Children should be a regular part of every public relations program of both state and component dental societies.

C. In addition to contacts mentioned under "A," contacts should be maintained with all recognized health, educational and welfare agencies in the community.

D. Similar contacts should be maintained with the Boy Scouts, Girl Scouts, Campfire Girls, American Legion, service clubs, etc., so that cooperative endeavors may be prompted and carried out with the dental society playing an active rôle.

E. Because of the increasing interest in industrial dental programs, dental societies, either through their councils on dental health or through similar committees, should familiarize themselves with such programs or contemplated programs and offer constructive advice in their guidance.

F. The society should remain in the forefront of the national defense program, particularly in communities where industrial and military concentrations exist. Guidance in these activities should come from the society's military affairs committee or some other especially prepared committee.

3. To advance the public's regard for the services of the dentist and to attract the highest type of young men and women to the profession.

A. The monthly meetings and especially the annual meetings of state and component societies serve to place Dentistry squarely in the community's news spotlight. The annual meetings should be publicized. At least one function to which the public is invited should be included in the program. Public officials and representatives of civic, school and health groups should be invited to participate as program speakers or in panel discussions. The public relations committee chairman should seek a voice in the planning of every important meeting of his society and be ready to suggest inclusion of program events to advance the public relations program.

B. Contact should be established with high school faculty advisors so that stu-

dents considering a career in Dentistry may consult with society officials and receive authoritative advice and assistance.

4. Generally speaking, a public relations program should be developed to convey the following messages:

A. That the dentist is a professional and scientific man.

B. That he is concerned with mouth health in relationship to general health.

C. For the period of the war, that the dentist is making a vital contribution to the prosecution of the war.

D. That the dentist is deeply concerned with the welfare of his community.

E. That the dentist works in cooperation with the medical profession in an endeavor to improve the general health and dental health of the community and nation.

IV
TECHNICS

The technic of conducting a public relations program involves neither magic nor mystery. Public relations has grown into a profession, employing professional persons. Twenty-five years ago, newspaper men and organizational leaders looked upon public relations endeavors with suspicion. Today, efforts to disseminate information for public education are quite generally respected and appreciated when they are made legitimately and intelligently.

An honest endeavor to be of public service is the prerequisite for public relations projects. The committee should regard itself as a regular news source for the newspapers.

Truthful, accurate releases and frank dealing with editors constitute the publicity order of the day.

It is difficult to compile an open-and-shut list of "do's and don'ts" on the matter of good taste with regard to attracting popular interest in publicity for a dental society. The Bureau of Public Relations of the American Dental Association, for example, frowns on beauty contests with leg-art predominating. On the other hand, when animation is desired in a photo of an exhibit (and a good news picture should be animated), it is desirable, of course, that the subject be both pretty and wholesome.

Because publicity for a professional group must be free from sensationalism of any kind, the Bureau suggests general acceptance of its own self-imposed rule in deciding matters of taste: "When there is any reasonable doubt, don't do it."

In writing publicity releases: Be clear. Be accurate. Be interesting. Follow the simple copy directions set forth in the division of this article under the title "Some Publicity Blueprints."

Maintaining and advancing public relations contacts is principally a matter of patient work—the technics are dependent entirely on the individual personalities of the committee members, who, as we have indicated, should be chosen for their aptitude.

Seekers after personal publicity have no place on the public relations committee. However, when the use of an individual's name is essential to a contact or to a publicity release, false modesty should not prevent its being used. In fact, few news releases could be written acceptably without quoting an individual or ascribing an announcement to an officer of the society or reputable organization. As a rule, however, the public relations chairman should determine what names should be used, in conformity with the policy of the society. The Bureau suggests an elastic policy under which the names of society officers be used in connection with releases which deal with matters concerning their jurisdiction, the quotes to receive their prior approval. Here again, good judgment and good taste must dictate procedure. Sometimes, undue modesty in refusing to permit the use of an officer's name

is as harmful as its too frequent use.

In discussing technics, we must conclude with the suggestion that, in cities and in extensive districts, professional public relations services be engaged when funds permit. Responsible, established agencies render valuable service in advising all along the line of the program, as well as preparing and distributing releases and acting between the society and the press. Such services do not substitute for the public relations committee: they simply implement it. The best method of determining the responsibility and standing of a publicity agency is consideration with the city editors of the city newspapers.

V

SOME PUBLICITY BLUEPRINTS

The suggestions that follow, which were prepared with the assistance of the publicity agency engaged by the Bureau of Public Relations of the American Dental Association, cover accepted newspaper practices.

Publicity releases should be written in the form of a newspaper story, not in the form of notes. If the release concerns a meeting or other event on which there is a program or brochure, clip the printed material to the release.

The release should bear the name of the source of the material and be "slugged" with a release date, the date on which it is desired that the story be printed; in this fashion:

Name of dental society or organization.
Name of person sending release.
Address and phone number.
For release on day and date.

Leave several inches of white space before starting the release; allow generous margins and indent paragraphs clearly. All releases should be typed and clean copies are most acceptable.

Except when asked by a member of a newspaper staff to address all releases, or a particular release, to him, send all releases addressed: "City Editor." Send releases to all papers simultaneously. If the story has national implications, address them also to the city editors of press associations (International News Service, Associated Press and United Press) if they have bureaus or correspondents in your locality. Send them also to "News Editor" of the radio stations.

Let us "blueprint" an annual dental society meeting which is to be held on some imaginary May 15. The chief speaker, let us say, is John Q. Officer of the Hometown Board of Health. In connection with the meeting, several clinics are to be held and there will be a dental health exhibit to which the public is invited.

The first step is to make a written schedule of releases and activities. Then follow the schedule. Here is a typical schedule:

May 1: Send an announcement of the meeting, leading off with the fact that Dr. Officer will be the chief speaker. Include all other information on the clinics and the exhibit.

May 1: Write to Dr. Officer and other speakers and request enough head pictures to supply all papers, as well as copies of their papers or comprehensive digests, as far as possible in advance of May 15.

May 7: Send the second advance release on the meeting, leading off with an invitation to the public to attend the exhibit. Include a quote from the society president stressing this invitation. Include other general details of the meeting.

May 13: Send a final advance story on the meeting for release May 14, basing the lead paragraph on a round figure of the number of dentists expected to attend and stressing Dr. Officer's appearance and the health exhibit. Include other general details. Attach program.

May 13: Contact photo and city editors by typed memo or telephone to invite them to send photographers and reporters to a preview of the hall of

exhibits so that they may have pictures and stories for publication on the day of the meeting.

May 14: Furnish all city editors with copies of papers of Dr. Officer and others slugged "Please hold for release on delivery at 3 p. m., Friday, May 15."

May 14: Send an invitation to the city editor (and photo editor) to assign a reporter and a photographer to the meeting, giving the location of a press headquarters if one is to be set up, or explaining when and where publicity committee members may be contacted.

On the day of the meeting, make yourself and your committee members available to newsmen and photographers to assist them in every way. When it has not been possible to obtain enough copies of papers or addresses to distribute to all, make the master copies available to the reporters when they are covering the meeting so that they do not have to sit through entire presentations (thus missing editions) unless, of course, they wish to.

When publicity agencies handle such material, all technical papers and addresses are digested in news fashion in advance, and the full papers held for reporters to check.

The foregoing schedule will suggest similar handling of events of equal news interest. Monthly meetings require less elaborate handling.

Through sending to the newspapers releases which are furnished monthly in the A.D.A. bulletin, always slugged correctly, and through his other releases and activities, the publicity chairman of the local society will come to be looked upon by city editors and reporters as the news source of all copy relating to dentistry in the community.

As this understanding with the newspaper grows, the chairman will find feature writers coming to him for the development of local stories in connection with national scientific news and, in addition, the chairman will be able to suggest features to the newspapers.

The familiar quotation that a chain is as strong as its weakest link is an adequate, if not an original, way of expressing the responsibility of local participation in a national public relations program to improve the profession and the health of the nation.

The national association can formulate a national program, but it is the men in the local societies who make it possible to carry the message to the individual American. The most effective stories are those written with a local angle and placed in local papers. As each local society gains in prestige through its relationship with the public, in that proportion does the A.D.A. gain in prestige on a national scale.

The Bureau of Public Relations of the A.D.A. looks to each community for greater cooperation in a program that will mean increasingly improved dental health throughout our nation and increasingly imposing stature for the dental profession.

Grateful acknowledgment is made to the firm of Arnold & Jackson, American Dental Association's Public Relations council, for their advice in the preparation of this article.

NATIONAL COMMITTEE ON PHYSICAL FITNESS

THE National Committee on Physical Fitness met in Washington, D. C., July 14 and again July 27 and 28, to arouse interest on the part of the public in greater emphasis on physical fitness, which includes dental fitness. Originally, the movement started with the Federal Security Agency, which later joined with the American Medical Association in the development of a program designed to specially emphasize the subject of physical fitness.

Col. L. G. Rowntree, chief of the Medical Division of Selective Service, is the chairman of the Joint Committee of the American Medical Association and the Committee on Physical Fitness, Federal Security Agency. The members of the committee are as follows: Dr. Roscoe L. Sensenich, Dr. Morris Fishbein, Maj. Gen. George F. Lull, Dr. William Stroud, Dr. L. A. Buie, Dr. Hiram A. Jones, Dr. William P. Jacobs, Dr. John W. Studebaker, Mr. Arch Ward, Mr. A. H. Pritzlaff and Capt. C. Raymond Wells.

Captain Wells, President of the American Dental Association, is a member of the joint committee, which is the Policy Making Committee.

The Medical Affiliate Group of the Program Council has as chairman Olin West, secretary of the American Medical Association; N. B. Van Etten, past president of the American Medical Association, and Lon W. Morrey, director of the Bureau of Public Relations, American Dental Association.

The purpose of the organization is to enlist the interest of the public in a special emphasis program on physical fitness. The program will be promoted by civic organizations, church groups, medicine, dentistry, education, labor, management, sport groups and promotion groups.

The interest of the American Medical Association in a quasigovernmental activity is significant, showing that American medicine is interesting itself in a sound program of public relations. Included with the American Medical Association are the American Dental Association, the American Hospital Association, the American Public Health Association and the American Pharmaceutical Association. In any movement designed to prevent disease, the American Dental Association must play an active part and it will work side by side with the American Medical Association in this physical fitness program. It is anticipated that the dental profession will be called upon to conduct dental examinations of school children and certain adult groups as well as to aid in the establishment of practical methods for calling the attention of the public to its part in promoting dental fitness, and to further the correction of remediable dental conditions.

COMMITTEE ON LEGISLATION

CALIFORNIA COURT HOLDS DENTAL LABORATORY ADVERTISING TO BE ADVERTISING TO PRACTICE DENTISTRY

IN the case of Board of Dental Examiners v. Jameson, decided May 29, 1944 and reported in Volume 149, Pacific Reporter 2d Series on page 223, the Second District Appellate Court of California held that, under the provisions of the California law, when a dental laboratory advertises to sell dental plates, it is advertising that it is engaged in the practice of dentistry.

An Oklahoma case, Curtis v. Registered Dentists of Oklahoma, 143 P2d 427, which is similar to this case, was reported in THE JOURNAL March 1, 1944, page 393.

The decision of the Court in Board of Dental Examiners v. Jameson was as follows:

This is an appeal from a judgment permanently enjoining and restraining defendant from carrying on or conducting the practice of dentistry, as that profession is defined and regulated by Chapter 4, Secs. 1600-1752, of the Business and Professions Code, Stats. 1937, Ch. 399, pp. 1229, 1241-1254, and which chapter is commonly known and cited as the "Dental Practice Act." Except as otherwise indicated, section numbers herein referred to are sections of said code. Authority for the commencement and prosecution of this litigation is contained in section 1705.

The cause was submitted to the trial court upon an agreed statement of facts which, so far as pertinent to the disposition of this appeal, recited that the defendant never has been, and is not now, licensed to practice dentistry in the State of California; that he "caused a certain advertisement to be printed, published and circulated to the public" in the Los Angeles telephone directory on or about September 1, 1941, and again in the issue of June, 1942, reading as follows:

Perfect
Dental Plates
are Not expensive
If You Arrange to Deal with
Manufacturing Dental Laboratory
This is not a dental office, but a laboratory. Our entire facilities are devoted to the building of fine plates which you may arrange to purchase at our low laboratory rates.
Plates Repaired and Rebuilt
E. K. Jameson Dental Laboratories
4157 W. 5th St. at Western
Phone Expstn 1000

The agreed statement of facts also narrated that defendant is an individual doing business in the City of Los Angeles in his own name and under the firm name and style of Jameson Dental Laboratories; that his business consists of the construction, making, alteration and repairing of bridges and dentures, when the casts or impressions for the work have been made or taken by a licensed dentist and a written authorization signed by a licensed dentist accompanies each order given to appellant for such work; that in some instances appellant does such work at the instance and request of some licensed dentist, delivering the completed work to him; that in instances when a layman approaches with the view of buying the bridges and dentures from him, defendant "refers the layman to dentists, submitting a list of three names together with a statement that he is not a dentist and that he has no authority or authorization by law to supply them with their wants but that the same must be made through a dentist and that the dental fees must be arranged with the dentists; that, however, he does the laboratory work and supplies the material therefor and that the same may be paid by the layman directly to "defendant" for the said laboratory fees, which said fees are wholly removed from the dental fees which the said layman pays directly to the dentists"; that defendant "has on display in his laboratory various samples of dentures man-

ufactured by him"; and that he shows them "to any and all persons who inquire relative to the same and quotes his price for each sample irrespective of whether the inquiry comes from dentists or from laymen or members of the public, and that the prices for his said dentures are fixed according to the value of each piece of merchandise"; and that "in case of the layman or member of the public making such inquiry," defendant advises that the price quoted is a fixed price only for the laboratory work and denture and does not include the fees charged by the dentist."

Based upon such agreed statement of facts, the court found "that it is true that said E. K. Jameson" (an unlicensed person) "at all times mentioned in said complaint has been, and is now, engaged in carrying on and conducting the practice of dentistry, as defined in the Dental Practice Act, in the State of California, in that he did, by causing said printed advertisement . . . to be printed, published and circulated as aforesaid, indicate and now continues to indicate by said printed advertisement that he will construct, alter, repair, and sell dentures and artificial dental plates."

The sole issue presented upon this appeal is whether, because of the publication and circulation of the aforesaid advertisement, defendant is engaged in the practice of dentistry as such practice is defined in section 1625 of the Act, which provides:

"A person practices dentistry within the meaning of this chapter who . . . (c) . . . in any way indicates that he will construct, alter, repair or sell any bridge, crown, denture or other prosthetic appliance or orthodontic appliance."

The industry of counsel has not produced any authorities upon the precise question with which we are here confronted, nor have our efforts in that regard been rewarded with the discovery of an applicable authority. The case is concededly one of first impression.

We must, therefore, have recourse to the cardinal rule that in the construction of statutes the legislative intent must govern. In attempting to arrive at the legislative intent, the entire act must be considered, as well as other enactments upon the same subject, including the legislative history of the legislation upon the subject matter in question; all for the purpose of enabling the court to give the statute the force and effect which the legislature intended, and so as to obviate the evil sought to be remedied.

Applying the rule just announced to the statute here under consideration, in an effort to determine whether the conduct of defendant amounted to the practice of dentistry we find that in the year 1885 dentistry was, for the first time, regulated in California (Stats. 1885, Ch. CXXVII, p. 110). A new act was adopted in 1915, Stats. 1915, Ch. 426, p. 698. The original act of 1885 required only that those who were then engaged in the practice of dentistry should, within six months after the effective date of the act, register with the Board of Dental Examiners. Without specifying any educational qualifications, it was also provided that, after the act became effective, all persons other than those then engaged in the practice of the profession should be required, as a prerequisite to entering upon such practice, to submit to an examination by the Board as to their qualifications. By the act of 1915 it was required that all persons desiring to take an examination must be possessed of a high school education, as well as a diploma from a reputable college of dentistry. Subsequently, other amendments were made to the act, and in 1937 the Dental Practice Act was made a part of the Business and Professions Code.

It is interesting and helpful to note that section 11 of the 1915 act provided that:

"Any person shall be understood to be practicing dentistry within the meaning of this act who shall . . . (3) in any way indicate that he will perform by himself or his agents or servants any operation upon the human teeth or jaws, or (4) make an examination of, with intent to perform or cause to be performed any operation on the human teeth or jaws . . . but nothing in this act contained shall prohibit . . . an unlicensed person from performing merely mechanical work upon inert matter in a dental laboratory."

Manifestly, there was not included in the definition of the practice of dentistry just quoted, mechanical operations consisting of the construction, making, altering or repairing of bridges and dentures such as characterized the dental laboratory business conducted by defendant herein. Undoubtedly, a

dental technician could have contracted and dealt directly with a customer who sought such service. But, in 1933, the legislature further extended the definition of those who "should be understood to be practicing dentistry within the meaning of this act" so as to directly affect the activities of unlicensed persons who were engaged in doing dental work of a mechanical nature, by adding to the foregoing subdivision (3) of section 11 of the 1915 act the following: "or in any way indicates that he will construct, alter, repair or sell any bridge, crown, denture or other prosthetic appliance or orthodontic appliance" (Stats. 1933, ch. 84, p. 526). By the same act, the language of section 11 of the 1915 statute relating to what an unlicensed person might do was deleted, and in its place was submitted the language now appearing in subdivision (e) of section 1626 of the Business and Professions Code, reading:

"The following practices, acts and operations, however, are exempt from the operation of this chapter . . . (e) The construction, making, alteration or repairing of bridges, crowns, dentures or other prosthetic appliances or orthodontic appliances when the casts or impressions for this work have been made or taken by a licensed dentist, but a written authorization signed by a licensed dentist shall accompany the order for the work or it shall be performed in the office of a licensed dentist under his supervision."

It seems clear from a reading of the foregoing legislative changes in the Dental Practice Act that the lawmaking body sought thereby to raise the standards of the profession, and in so doing that they extended the definition of what constituted the practice of dentistry beyond simply the actual performance of operative work or treatments on the gums, jaws or teeth. To that end, it is to be noted that in defining what constitutes the practice of dentistry, section 1625 not only includes one who "performs, or offers to perform, an operation or diagnosis of any kind . . . upon the human teeth, alveolar process, gums or jaws," but, by subdivision (c) of this section provides that any person who "in any way indicates that he will perform . . . any operation upon the human teeth . . ." or in any way indicates that he will construct, alter, repair or sell any bridge, crown, denture . . . will thereby be practicing dentistry."

An examination of the stipulation of facts herein discloses that appellant, who possessed no license to practice dentistry, was advertising that "our entire facilities are devoted to the building of fine plates which you may arrange to purchase at our low laboratory rates." Manifestly, appellant was thereby indicating to the public that he would "construct and sell" plates and dentures. Subdivision (c) of section 1625 unequivocally declares that such conduct constitutes the practice of dentistry.

Appellant, however, contends that subdivision (e) of section 1626 specifically exempts his business from the operation of the Act by expressly permitting an unlicensed person to engage in the mechanical work done by appellant under the conditions described in said subdivision (e) of section 1626, all of which conditions concededly were met by appellant in the conduct of his business. Without doubt, appellant has the right to engage in the construction, alteration or repairing of plates and bridges under the conditions which, according to the agreed statement of facts, characterized his operations, without impinging upon the provisions of section 1625, which defines what amounts to the practice of dentistry, but, when he advertises to the public that he will do these things, he is practicing dentistry. The main objective of the legislation prohibiting certain forms of advertising is to protect the public from deception. If appellant be permitted to advertise as he did he would be indicating that he will do, or offers to do, that which only a licensed dentist can do, because, under the provisions of subdivision (e) of section 1626, an unlicensed person can only engage in the mechanical work done by appellant "when the casts or impressions for this work have been made or taken by a licensed dentist"; and then only when "a written authorization signed by a licensed dentist shall accompany the order for the work or it shall be performed in the office of a licensed dentist under his supervision."

Furthermore, judged in the light of the inhibitions against certain forms of advertising by licensed dentists contained in section 1680, which, among other things, prohibits a licensed practitioner from asserting

professional superiority, or advertising a guarantee of his dental service, and for the doing of which he may be disciplined for unprofessional conduct (Barron v. Board of Dental Examiners, 44 Cal. App. 2d 790, 113 P. 2d 247; Webster v. Board of Dental Examiners, 17 Cal. 2d 534, 110 P. 2d 992), it is manifest that appellant's advertisement of "perfect dental plates" would not be allowed to a licensed dentist. We do not regard it as at all reasonable to assume that the legislature intended that dental laboratories, or laboratory technicians, should be allowed to engage in practices denied to licensed practitioners. Neither do we believe that it was ever intended by the legislature that dental laboratories and technicians should be permitted to compete with licensed dentists. The legislative intent in this regard is clearly indicated by the language of section 1625, which declares that any person who "by card, circular, pamphlet, newspaper or in any other way advertises himself or represents himself to be a dentist," or who "offers to perform an operation or diagnosis of any kind" is practicing dentistry. Whether a dental technician or manufacturer may legitimately, by advertising or otherwise, bring to the attention of licensed dentists the business in which such technician or manufacturer is engaged and the service he is prepared to render is not before the court in the instant proceeding and need not be determined. True, in the instant case, appellant's advertisement states therein that "this is not a dental office, but a laboratory." However, taken as a whole, the advertisement is not directed to practicing dentists whose laboratory work appellant is seeking and which work is to be done under the prescription or direction of such licensed practitioner, but the advertisement is an invitation to the public to "arrange to deal with manufacturing dental laboratory." And for what purpose? Manifestly, to secure professional services of the kind and type which, according to subdivision (c) of section 1625, is reserved only to those licensed to practice dentistry, unless it is done by an unlicensed person in conformity with the conditions and restrictions imposed by subdivision (e) of section 1626.

Appellant urges that the right given to manufacture dental plates implies not only the right to sell them, but also the right to advertise such products. Ordinarily this might be true, but in connection with the manufacture and fitting of dentures or plates in the human mouth, "the legislature was not dealing with traders in commodities, but with the vital interest of public health, and with a profession treating bodily ills and demanding different standards of conduct from those which are traditional in the competition of the market place." Semler v. Oregon State Board of Dental Examiners, 294 U. S. 608, 612, 55 S. Ct. 570, 572, 79 L. Ed. 1086; Webster v. Board of Dental Examiners, supra.

For the reasons herein stated, the judgment from which this appeal was taken is affirmed.

YORK, P. J., and DORAN, J., concur.

* * * * *

The supreme courts of several states have held that their dental practice acts prohibit dental laboratories from advertising direct to the public. There are some decisions in other states, however, which hold that there is nothing in the dental practice acts of those states to prohibit dental laboratory advertising. All of these decisions should be studied before a change is made in any dental practice act.

The above-mentioned supreme court decisions have been mimeographed and will be mailed to any dentist upon request to the Committee on Legislation, 222 E. Superior St., Chicago 11, Ill.

GEORGE H. FOX, *Secretary,*
and Legal Advisor,
Committee on Legislation.

COUNCIL ON DENTAL HEALTH

SUMMARY OF REPORTS RECEIVED FROM STATE COUNCILS ON DENTAL HEALTH

SOUTHERN CALIFORNIA

The Council on Dental Health of the Southern California State Dental Association is composed of the following committees: (1) Committee on Social Trends, (2) Committee on Special Dental Services, (3) Prepayment Committee, (4) Committee on Undergraduate, Graduate and Postgraduate Education, (5) Industrial Committee, (6) Research and Caries Control Committee, (7) Professional Relations Committee, (8) Victory Corps Committee and (9) Health Education Committee. These committees, plus a chairman and secretary appointed by the president of the association, constitute the Council on Dental Health.

The first action taken was to join with the California State Dental Association in developing a plan for establishing a major administrative unit of dental health in the state department of public health on a basis comparable with that of other major units in the department. Information on organization and administration was obtained from other states to aid in formulating recommendations for establishing a bureau of public health dentistry. The suggested functions of the bureau would be to carry out a program of dental health education, dental treatment and research. The plan has been submitted to the state director of health for consideration.

"A specimen program" for the officers of the component societies was held in March 1944 for the purpose of outlining the objectives and activities of the A.D.A. and the state councils on dental health.

A conference was held with a representative of the Los Angeles Industrial Securities Section of the Defense Council to determine policies and general objectives in connection with a survey of industrial plants and the development of oral health programs.

In an effort to aid in the work of the American Society for the Control of Cancer, the following recommendations were proposed: (1) that the Executive Council of the Southern California State Dental Association approve of the participation of the Council on Dental Health in the work of the cancer clinic sponsored by the Women's Field Army of the American Society for the Control of Cancer, Inc., and (2) that funds which are being held by the Association for the purpose of research be allocated in the amount of $3,120 for one year to meet the expense of retaining a woman dentist to make the examination and direct the program, under the supervision of the Council on Dental Health, provided all details can be satisfactorily arranged with the staff of the clinic.

The Victory Corps program was carried out successfully in urban areas chiefly because it was operated as a part of the established school health activities. Many rural areas found it impossible to develop the dental phase of the Victory Corps Program owing to the acute shortage of dentists. In Los Angeles, correction certificates were issued to 87 per cent of Roosevelt High School students and to 77 per cent of Franklin High School students.

DELAWARE

The high school Victory Corps Physical Fitness dental program was launched in September 1943. Plans were made to examine all eleventh and twelfth grade students, a total of approximately 4,000.

Examinations were made and follow-up work to obtain corrections was performed by dental hygienists. This phase of the program was carried out in all but two of the schools. Health education activities consisted of the use of posters, models and literature. The films "About Faces" and "Student Flyer" were shown in school assemblies.

An appraisal of the results of the project is difficult to obtain. Not only is transportation a problem in a state that is largely rural, but there is also a need for more dentists, the ratio being one dentist for every 5,000 persons. However, a number of small schools were successful in obtaining dental corrections for all eleventh and twelfth grade students.

An interesting study made in Kent County included all eleventh and twelfth grade students in white and Negro schools. The collection of data began in the fall of 1941. Of the 559 students examined, 81 per cent needed dental care. Eighty-three per cent had received treatment previously. There was an average of 4.6 carious teeth per student. When the eleventh and twelfth grade students were examined recently as a part of the Victory Corps Program, 77 per cent of the 512 students needed dental attention; 83 per cent had received treatment previously, and there was an average of 3.1 carious teeth per student. The improved dental conditions in the latter group may be due to the emphasis which was placed on good nutrition, home care and periodic visits to the dentist.

ALLEN O. GRUEBBEL,
Executive Secretary.

A.D.A. JUNIOR MEMBERSHIPS AT JULY 31, 1944

Atlanta Southern Dental College	100	Temple University Dental School	391
Baylor University	84	Texas Dental College	116
Chicago College of Dental Surgery	223	Tufts College Dental School	47
College of Physicians & Surgeons	88	University of Buffalo	46
Columbia University	195	University of California	14
Creighton University	43	University of Detroit	46
Georgetown University	143	University of Illinois	74
Harvard University Dental School	3	University of Louisville	180
Indiana University School of Dentistry	162	University of Maryland	222
Kansas City Western Dental College	169	University of Michigan	45
Loyola University	71	University of Minnesota	97
Marquette University	227	University of Nebraska	18
Medical College of Virginia	111	University of Pennsylvania	287
New York University	376	University of Pittsburgh	134
North Pacific College of Oregon	194	University of Southern California	191
Northwestern University Dental School	88	University of Tennessee	10
Ohio State University	205	Washington University School of Dentistry	108
St. Louis Univ. School of Dentistry	39	Western Reserve University Dental School	147
State University of Iowa	59	Total Junior Members	4,753

RESOLUTION BY TRUSTEES AT EXECUTIVE SESSION REGARDING SECRETARY AND EDITOR

The following resolution was passed by the Board of Trustees of the American Dental Association at its meeting in Chicago, February 21, 1944.

The Board of Trustees convened in executive session at 5:00 p.m., February 21, to consider replacements of Secretary and Editor.

Moved by Dr. Wolfe: The term of office of the present Secretary will expire in October 1944.

The Board of Trustees recommends that the President of the American Dental Association appoint a committee of three from the Board of Trustees to canvass the field for prospective candidates for the office of Secretary, and be prepared to present the names of the candidates at the October 1944 meeting of the Board of Trustees for the consideration and selection of a candidate to be recommended to the House of Delegates.

Furthermore, should the present incumbent not become the candidate of the Trustees, the Board favors recommending to the House of Delegates the sum of $2,500 per annum be paid during the lifetime of Dr. Harry B. Pinney with the title of Secretary Emeritus, in consideration of his faithful service to the American Dental Association.

Seconded by Dr. Miller. Vote unanimous.

Moved by Dr. Meisel: The contract of the present Editor of the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION expires October 1944. It is the consensus of the Board of Trustees that the contract not be renewed.

The Board of Trustees recommends that the Journal Committee work out a suitable program of remuneration for Dr. Anthony during his lifetime.

In the meantime this committee should canvass the field for prospective candidates and bring in recommendations to the October 1944 meeting of the Board of Trustees for a successor.

Furthermore, the Board of Trustees recommends that Dr. Anthony be designated as the Editor Emeritus of the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

Seconded by Dr. Summers. Vote unanimous.

(Signed) WALTER H. SCHERER,
Acting as Secretary at the
request of the Board of Trustees.

NATIONAL BOARD OF DENTAL EXAMINERS

The following candidate has successfully passed Part 2 of the National Board examinations, May 1-2, 1944:

Northwestern University
J. DANA KINTNER

DEATHS

BAKER, J. M., Harrison, Ark.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1887; died May 16; aged 80.

BERLIN, CHARLES K., Memphis, Tenn.; University of Tennessee, 1935; died July 16; aged 37.

BESORE, JEREMIAH H., Smithsburg, Md.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1897; died June 14; aged 67.

BONNELL, FRANKLIN C., Hollister, Calif.; College of Dentistry, University of California, 1896; died May 14; aged 71.

BORDERS, HARRY PALMER, Portland, Ore.; North Pacific College of Oregon, School of Dentistry, 1907; died July 5; aged 62.

BORN, WILLIAM T., Kenton, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1889; died June 24; aged 79.

CALCOTT, REID, East Liverpool, Ohio; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1921; died June 13; aged 71.

CALLAGHAN, FRANK C., Erie, Pa.; Indiana University School of Dentistry, 1883; died July 4; aged 78.

CORREOSO, PHILIP NELI, Baltimore, Md.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery; died July 8; aged 70.

CROUCH, CHARLES BAKER, Canton, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1918; died June 13; aged 49.

CULZRETH, NEIL ALEXANDER, Wilmington, N. C.; Atlanta Dental College, 1903; died June 22.

DANZ, BEATRICE E., St. Paul, Minn.; University of Minnesota, College of Dentistry, 1916; died June 13; aged 53.

DAUGHERTY, J. W., Bardstown, Ky.; University of Louisville, School of Dentistry, 1899; died June 21; aged 78.

DAVIS, MONTGOMERY L., Louisville, Ky.; University of Louisville School of Dentistry, 1934; died April 28; aged 40.

DEBOW, STEWART W., Youngstown, Ohio; died June 17; aged 76.

DUFF, VETUS B., Carrick, Pa.; died June 30.

DYNES, OMER A., Indianapolis, Ind.; Indiana University School of Dentistry, 1924; died June 27; aged 50.

EIDENMULLER, FRANK, Concord, Calif.; College of Dentistry, University of California; died June 1; aged 60.

EMMONS, ALBERT L., Brewerton, N. Y.; died July 9; aged 78.

FEINDT, WILLIAM B., Baltimore, Md.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1939; died in Asia June 6; aged 28. Dr. Feindt was a lieutenant in the U. S. Army Dental Corps.

FRANZIUS, G. H., New York, N. Y.; New York Dental School, 1897; died July 2; aged 77.

FREEMAN, W. I., Auburn, Ky. University of Louisville, School of Dentistry, 1900; died July 6.

GLASS, EARL C., Independence, Kan.; Western Dental College, Kansas, 1901; died April 29; aged 68.

GOLDEN, FRANK A., Hartford, Conn.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1904; died June 26.

GRESIK, HERMAN E., Chicago, Ill.; Chicago College of Dental Surgery, Dental Department of Loyola University; died July 3 in England; aged 25. Dr. Gresik was a captain in the U. S. Army Dental Corps.

HAGERTY, JOHN F., Boston, Mass.; Tufts College Dental School, 1918; died June 19; aged 49.

HALEY, J. F., Brooklyn, N. Y.; Temple University School of Dentistry, 1904; died July 20.

HANNING, WILLIAM H., Indianapolis, Ind.; University of Louisville, School of Dentistry, 1901; died July 10; aged 53.

HARLAN, H. L., Boonville, Mo.; Baltimore College of Dental Surgery, 1889; died June 6; aged 75.

HARTMAN, JOHN ALBERT, Washington, D. C.; died July 5; aged 92.

HIBBARD, LLEWELLYN EUGENE, Burns, Ore.; died June 23; aged 81.

HOLBROOK, HUGH H., Van Wert, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1904; died June 21; aged 62.

HUTCHISON, W. TURNER, Nashville, Tenn.; Vanderbilt University, School of Dentistry, 1915; died June 10; aged 52.

KIMMEL, ALBERT, Elk Point, S. D.; died June 24.

LEVINSON, TOBIAS, Brookline, Mass.; died May 15 at Sheppard Field, Texas; aged 37. Dr. Levinson was a lieutenant in the U. S. Army Dental Corps.

MCCOY, JOHN M., Boston, Mass.; Tufts College Dental School, 1919; died July 9; aged 53.

MCWILLIAMS, J. S., Whitfield, Miss.; died May 28; aged 60.

MAGINNIS, EUGENE, Chicago, Ill.; Northwestern College of Dental Surgery, 1902; died July 15; aged 75.

MAGRUDER, WAVERLY T., Springfield, Mo.; Western Dental College, Kansas City, 1894; died June 5; aged 77.

MOFFATT, ROBERT T., Brookline, Mass.; Harvard University Dental School, 1895; died June 18; aged 70.

NATIONS, T. B., Oneonta, Ala.; died June 12; aged 94.

NEAL, GEORGE STOKES, Jackson, Miss.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1911; died May 19; aged 56.

NESSE, J. N., Thief River Falls, Minn.; University of Minnesota, College of Dentistry, 1912; died June 28; aged 65.

NICHOLS, W. B., Durant, Miss.; Atlanta Dental College, 1896; died May 19; aged 81.

NOBLE, CHARLES H., Miami, Fla.; Southern Dental College, Atlanta, 1915; died June 12; aged 50.

NUCKOLLS, HOLLAND M., Turlock, Calif.; College of Physicians and Surgeons of San Francisco, A School of Dentistry, 1901; died June 30; aged 66.

ORDON, HENRY J., Chicago, Ill.; Northwestern University Dental School, 1914; died July 20; aged 63.

OTTE, OLINDA AUGUSTA, Los Angeles, Calif.; died in June; aged 83.

PARLE, JOHN W., St. Louis, Mo.; Marion-Sims Dental College, St. Louis, 1904; died June 8; aged 57.

PARR, JAMES GILMORE, Martins Ferry, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1890; died June 26; aged 80.

POSEY, AUBREY A., La Plata, Md.; died June 23.

POTTER, FRED W., Sweet Briar, Calif.; College of Dentistry, University of California, 1905; died June 16; aged 63.

RAY, RALPH, Sarasota, Fla.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1907; died July 5; aged 56.

REIBEL, JULIUS, Elizabeth, N. J.; The New York College of Dentistry, 1918; died July 2; aged 53.

RIEGER, ALBERT B., Cohoes, N. Y.; University of Buffalo, School of Dentistry, 1895; died July 11.

ROBBINS, ROY BENNETT, Patchogue, N. Y.; University of Buffalo, School of Dentistry, 1907; died July 16; aged 61.

SHEEHAN, JOHN P., Lawrence, Mass.; Tufts College Dental School, 1921; died July 6; aged 49.

SIPLE, R. C., Cherokee, Iowa; State University of Iowa, College of Dentistry, 1914; died June 10; aged 57.

SMITH, GEORGE ARLINGTON, Springfield, Ohio; Georgetown University, 1913; died July 1; aged 57.

SMITH, R. L., Los Angeles, Calif.; died June 17; aged 50.

SOUZON, PETER N., Margate City, N. J.; Pennsylvania College of Dental Surgery; 1906; died July 1; aged 61.

STRAW, W. L., Davenport, Iowa; Pennsylvania College of Dental Surgery, 1889; died June 20; aged 80.

TAYLOR, BYRON S., Landis, N. C.; Atlanta Dental College, 1914; died June 11; aged 50.

TOMLINSON, JOSEPH R., Lake City, Fla.; Southern Dental College, Atlanta, 1901; died May 31.

TUTTLE, W. M., Slater, Mo.; died May 29.

TYER, ETTA PATTON, Troy, Kan.; died May 1.

WACH, CHARLES E., Chicago, Ill.; Northwestern University Dental School, 1916; died June 25.

WARD, WILLIAM W., Omaha, Nebr.; Omaha Dental College, Dental Department of the University of Omaha, 1904; died May 25; aged 65.

WARNER, CHARLES P., Boston, Mass.; died June 13; aged 69.

WEATHERBY, VIRGIL D., Chicago, Ill.; died July 11; aged 51.

WEBSTER, HAROLD B., Norfolk, Va.; Baltimore College of Dental Surgery, 1900; died July 3; aged 65.

WEYLER, JACOB, New Haven, Conn.; College of Dental and Oral Surgery of New York, 1916; died June 19; aged 52.

WHEELER, RALPH D., Pittsfield, Mass.; Tufts College Dental School, 1906; died June 24; aged 62.

WHITE, THURLOW A., Pittsburgh, Calif.; Chicago College of Dental Surgery, Dental Department of Loyola University; died June 24; aged 51.

WHITSON, LEROY L., Santa Ana, Calif.; Northwestern University Dental School, 1896; died July 4; aged 72.

WILDA, ODON J., Manitowoc, Wis.; Marquette University, School of Dentistry, 1914; died June 24; aged 53.

WISE, WILLIAM HARVEY, Alexandria, Va.; University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, 1899; died June 19.

YANDO, ARTHUR H., Bethesda, Md.; died March 14. Dr. Yando was captain in the Navy Dental Corps.

CORRESPONDENCE

"DENTAL PRACTICE IN THE FUTURE"

To the Editor:

I wish to offer some comments referring to John Oppie McCall's article, "Dental Practice in the Future . . . ", appearing in THE JOURNAL, January 1, 1944, and to C. Raymond Wells' correspondence concerning this article appearing in THE JOURNAL, February 1, 1944.

First of all, I am happy to learn that Dr. Wells attaches importance to the attitude of THE JOURNAL in permitting articles to appear under the designation "Freedom of Speech." This at last gives hope that voices may be heard by all and the merits of ideas can be presented with freedom, leaving acceptance or rejection to all those who will read and think and speak. Dr. Wells is to be complimented in making this a point of introduction.

Let us then take an inventory in the matter of our general opinion about existing social aspects of the dental problem. 1. Is it not a fact, despite our very high standards of technical achievement, that only a small percentage of the public receive complete and periodic dental care? 2. For the present, does not control of dental caries depend on complete and periodic dental care? 3. Is it not a fact that such control cannot be provided because we do not have enough dentists to do the job?

If there is agreement on the foregoing points and Dr. McCall's article is read in the light of such agreement, is he not offering for consideration an implementation program which, in his opinion and for present argument, would in fact accomplish the very control which we seek?

The parallel suggested with the common cold by Dr. Wells is not actual. In the case of the cold, the medical profession cannot find specific controls. We, on the other hand, know that we could control dental caries if we only had a sufficient number of dentists to treat carious lesions soon enough and often enough. This can be proved by programs now in operation and by statistical experience.

Dr. Wells feels that Dr. McCall's ideas are to present war conditions—"in time of world stress and strain." Has he overlooked the fact that Dr. McCall has been in contact with the dental caries problem in the magnificent laboratory of day-by-day experience for twelve years? An experience which most of us must obtain by observation, discussion, reading? Can we justly place deductions based only upon these observations etc. against ideas growing directly out of wrestling with the dental problem daily as Dr.

McCall has done? It seems therefore no "paradox" . . . "that the author heads an institution maintained to provide dental treatment for children."

His ideas are born out of the technical aspects of a problem which distresses us all, but which he as a technician in contact with the problem must find solutions for.

Do we forget that Alfred Fones, in first suggesting the use of the dental hygienist for oral prophylaxis, met with similar opposition in the form of fears that standards would be lowered? Dr. Fones had to argue for years that dental hygienists, if properly trained and supervised, would not prostitute their trust; that they would not, on their own demand, proceed to fill teeth and represent themselves as periodontists. Have not those who listened to Dr. Fones' precepts proved these fears unfounded? Has not the dental hygienist in fact proved an aid to the dental profession?

Dr. Wells warns that such ideas as Dr. McCall's would "completely change and lower the standards." He also implies that such a program means "less education." Dr. McCall nowhere suggests reducing training or lowering standards of practice. To divide up a task among more specialized personnel suggests training in new ways, not necessarily training badly. The entire thesis of the McCall article is based upon education in new ways and with a division of labor which he hopes will implement our knowledge more effectively and more speedily for the common good.

The medical profession has never hesitated to increase the number of aides. Yet in no division of its work does it have to design its labors for 97 per cent of the people as certainly we must do to effect control of the dental problem. Why, then, does it seem "radical" to increase the number of aides to the dental profession?

Can Dr. Wells be placing his hopes only in that highly tentative Utopia when sufficient numbers of dentists will be practicing to hold dental caries in control? When is that day to arrive? Or must we at last accept the defeatist premise that we can never serve half of the people anyway?

Will the public continue to be satisfied with our "educational" programs? Must we not face the fact that, as present demands for dental service show us, people will take all the dental care that we can give them? The means of providing the service certainly must be more fully discussed.

But will the public wait? Is it not always a "time of stress" for the patient who needs us? When times are economically bad, patients cannot get all they need; when times are economically good, as now, there are not enough for us to meet their demands for dental services.

It cannot be too often reiterated that we must anticipate public action by having our own plans and programs agreed upon and ready for action. We need not fear that whomever we add as our associates to tackle our problems will be behind us in ideals, honesty or conscientiousness. If we lead properly, we can control both the standards of training and the legal safeguards of practice.

All this does not mean that one must endorse Dr. McCall's specific suggestions; but his fundamental thesis that we revamp our services to meet unfulfilled needs is the sort of straightforward thinking that attacks the problem from a sociologic point of view.

Dr. McCall has proved himself in terms of actual accomplishment and deserves to be listened to even if we may disagree. Above all, he speaks to us out of direct experience and honest conviction. It may also be that his is the counsel of timely wisdom.

CHARLOTTE S. GREENHOOD, D.D.S.,
450 Sutter Bldg.,
San Francisco 8, Calif.

CURRENT LITERATURE

Journal of Oral Surgery

April 1944

Titles marked with an asterisk are reviewed below.*

The Life and Achievements of Chalmers J. Lyons. Don H. Bellinger, D.D.S., Detroit, Mich.—99.

*Significance of Blood Dyscrasia in Oral Surgery. Fred A. Henny, D.D.S., Detroit, Mich.—106.

*Problems of Toxicity in Sulfonamide Therapy. Richard H. Lyons, M.D., and Raymond S. Van Harn, A.B., Ann Arbor, Mich.—118.

*Management of Early Acute Dento-Alveolar Infections. Bruce B. Cook, D.D.S., M.S., Detroit, Mich.—128.

*Further Studies on the Effect of the Prophylactic Use of Sulfathiazole and Sulfamerazine on Bacteremia Following Extraction of Teeth. Philip M. Northrop, M.S., D.D.S., and Mary C. Crowley, A.B., M.S.P.H., Ann Arbor, Mich.—134.

*Blood and Lymph Vessel Tumors Involving the Mouth. Don H. Bellinger, D.D.S., Detroit, Mich.—141.

Nitrous Oxide-Oxygen Anesthesia in Office Practice. J. D. Sullivan, D.D.S., Toledo, Ohio—152.

*The Dry Socket Problem. Vernor H. Eman, D.D.S., Grand Rapids, Mich.—158.

*Histoplasmosis: Report of Case. John W. Kemper, D.D.S., M.D., and Herbert J. Bloom, D.D.S., M.S., Ann Arbor, Mich. —167.

*Actinomycosis: Report of Cases. Olen H. McConnell, D.D.S., Grand Rapids, Mich. —173.

*Ameloblastoma (Adamantinoma) of the Mandible: Report of Case. Reed O. Dingman, A.B., D.D.S., M.S., M.D., Ann Arbor, Mich.—175

Section on War Dentistry

*Cystic Cavity in the Mandible: Report of a Case. Leroy W. Peterson, D.D.S., Battle Creek, Mich.—182.

*Incisive Canal Cyst of the Maxilla. Harold M. Matteson, D.D.S.—188.

Significance of Blood Dyscrasia in Oral Surgery

By Fred A. Henny

Patients with blood dyscrasia frequently make their first professional contact with dentists. Oral lesions alone are not completely diagnostic, but the picture should arouse suspicion and call for further investigation. The normal blood elements are described in this paper and deviations as well. The two broad classes of oral manifestations in blood dyscrasia are (1) lesions of the oral mucous membranes and (2) oral hemorrhage without lesions. Class I includes anemia, leukemia, agranulocytosis, purpura, polycythemia and scurvy. Class II embraces hemophilia, vitamin K and vitamin C deficiency and purpura.

Problems of Toxicity in Sulfonamide Therapy

By Richard H. Lyons and Raymond S. Van Harn

Sulfonamides are dangerous as well as life saving. They should not be given indiscriminately as consideration must be given to the potentiality of sensitivity production. Sulfadiazine seems to be the least toxic sulfonamide. The toxic effects are roughly classified into three groups: (1) direct, occurring shortly after administration; (2) sensitization, appearing after several days, and (3) kidney and urinary effects, from drug precipitation. Direct disturbances are, usually, nausea, headache, lack of coordination, psychoses, neuritis, myopia, convulsions, albuminuria and other evidences of kidney injury. Hypersensitivity, rarely occurring before the seventh day, usually does not reveal itself until administration may have been discontinued. Fever and dermatitis are the most common sensitivity manifestations, but jaundice, anuria, delirium, arthralgia, conjunctivitis, etc., sometimes are present. Readministration shortly after discontinuance increases the hypersensitivity reactions. If a reaction does occur, subsequent intake of sulfonamides is likely to again have a sensitivity reaction. Fever, which is one of the striking symptoms of sulfonamide hypersensitivity, usually develops during the second or third week of continued therapy.

Prompt withdrawal of the drug usually results in a gradual temperature decline. The presence or absence of leukocytosis is of no aid in diagnosing the cause of the fever when there is any question as to its etiology. Blood disorders can be serious and may be due to idiosyncrasy. Slowly developing anemia is not too serious as it can be discovered in time for control by transfusion. It is possible that the drug should be continued during agranulocytosis in order to combat the serious infections which accompany this disease. Kidney complications occurring because of drug precipitation ordinarily are prevented by the use of adequate alkali and fluid consumption. Generally speaking, blood and urine analyses at proper intervals are the keystones of control.

Management of Early Acute Dento-Alveolar Infections

By BRUCE B. COOK

"Early acute infection about the jaws has had considerable ill-management." Untimely surgical procedures may invite disaster. The processes of inflammation are reviewed. Surgical procedures should not be carried out in the presence of acutely infected pericoronal flaps or early pericemental abscesses. Roentgenograms are important in the diagnosis of periapical disease. Generally speaking, early extraction in acute apical infection is advised if the inflammation is confined to the bone. Curettage is contraindicated. Extra oral heat is inadvisable, although intra-oral hot irrigations are proper in the early stages. Cold applications may retard repair. No surgery measures should be taken in the presence of Vincent's infection.

Further Studies on the Effect of the Prophylactic Use of Sulfathiazole and Sulfamerazine on Bacteremia Following Extraction of Teeth

By PHILIP M. NORTHROP AND MARY C. CROWLEY

An investigation of the effect of prophylactic use of sulfathiazole and sulfamerazine on bacteremia following the extraction of teeth was continued in order to observe a large series of cases. Bacteremia occurs in 64 per cent of the cases reported when general anesthesia is used and in but 17 per cent when local anesthesia is employed. Bacteremia has little significance in normal individuals, but subacute bacterial endocarditis may be precipitated in one who has a preexisting valvular heart lesion. Of the cases, 16.1 per cent showed transient bacteremia without sulfonamide premedication. One gram of sulfathiazole plus 1 gm. of sodium bicarbonate was given every four hours for six doses, the last being taken three hours before operation. If the blood concentration of the drug arose to 4.6 mg. per hundred cubic centimeters, but 5 per cent of the cases had positive postoperative blood cultures. In the group whose blood concentration arose to but 2.9 mg. per hundred cubic centimeters, the incidence was 14.5 per cent positive. Optimum results therefore should anticipate a blood level above 4 mg. A group of patients was given one massive dose of 5 gm. each of sulfathiazole and sodium bicarbonate three hours before extractions. Thirty-one of forty-four cases had blood levels of over 4 mg. per hundred cubic centimeters. An incidence of 3.2 per cent positive cultures was found in this group, indicating that one massive dose is preferable to divided doses. Sulfamerazine did not seem efficacious in the prevention of *Streptococcus viridans* infections and therefore should not be used to prevent subacute bacterial endocarditis. The use of sulfonamides preoperatively in extraction of teeth should be reserved for patients predisposed to endocarditis. Once the premedication is administered, as much surgical work should be done at that time as is practicable.

Blood and Lymph Vessel Tumors Involving the Mouth

By DON H. BELLINGER

Blood and lymph vessel tumors, hemangioma and lymphangioma, grow by projecting buds of endothelium and are subject to circulation pressure. They are considered to be congenial. Radiation therapy is sometimes effective if employed early in infancy, preferably by 3 months of age. Carbon dioxide snow, cut in blocks, is effective in very superficial capillary lesions if no pigmentation is present. It is applied for twelve seconds at a time, application being repeated at intervals after the reaction has subsided. Multiple partial excisions are effective in the deeper lesions in selected cases. Where skin

inelasticity prevents partial excision, flaps and grafts are necessary. Intra-oral mucous membrane cavernous angioma can be treated by multiple excision if not too extensive or deep. In these larger cavernous types, the injection of sclerosing solutions is helpful. Thrombosis is produced. A large Luer needle is inserted in a blood sinus, the afferent vessel is compressed if possible, the blood is aspirated and 1 to 5 cc. of sodium morrhuate is injected. The area is then compressed to prevent the solution from leaking out of the tissues. After the local reaction has subsided, a new space is sought out and the procedure is repeated. Lymphangiomas are radioresistant and sclerosing solutions are ineffectual as agents for treatment. Complete surgical enucleation, when possible, is indicated unless partial excision, repeated as necessary, is all that can be accomplished.

The Dry Socket Problem

By VERNOR H. EMAN

When a patient returns with severe neuralgic pain four or five days after the extraction of a tooth, detailed examination of the socket should be made. More than half of the potential dry sockets can be anticipated and sedative dressings inserted immediately after extraction. The diagnosis is clinical in dry-socket cases. A fetid taste, the presence of débris in the socket, radiating pain, absence of all or part of the expected clot, etc., are signs with which all are familiar. Treatment should include removal of sharp bone margins and débris. Curetment to induce bleeding is contraindicated. Roentgenograms show any foreign material present. This should be gently removed. The socket is then cleaned, and a gauze strip in which a sedative is incorporated is lightly inserted in the wound. A liquid suggested for use with the gauze consists of 40 per cent chlorbutanol in oil of cloves, oil of wintergreen and oil of cassia, together with benzocain powder. The dressing should be changed after the first forty-eight hours and the wound irrigated with a warm saline solution.

Histoplasmosis: Report of Case

By JOHN W. KEMPER AND HERBERT J. BLOOM

Histoplasmosis, formerly thought to be rare, seems to be more common than was supposed. It is due to the presence of a cryptococcus, one of the fungi, but named *Histoplasma capsulatum*. Oral and upper respiratory area involvement suggest these regions as the initial site of infection. The common clinical characteristics are splenohepatomegaly, lymphadenopathy, pyrexia, leukopenia, anemia and chronic respiratory disease. Diagnosis depends on laboratory data which show the encapsulated organism in blood smears, marrow smears or lymph nodes or on biopsy of cutaneous or mucosal lesions. The mortality has been 100 per cent. A case is reported in which the chief complaint was tender sores on the tongue and upper lip. The patient was quite ill over a long period of time and many diseases were considered and eliminated differentially. The patient finally died and the diagnosis of histoplasmosis was confirmed postmortem. Any oral lesion which is persistent, tender, progressive, non-healing, ulceratively granulomatous and associated with enlargement of the spleen and liver, leukopenia, anemia, lymphadenopathy, pyrexia and chronic respiratory disease should be considered as potentially histoplasmosis.

Actinomycosis: Report of Cases

By OLEN H. MCCONNELL

Two cases of actinomycosis gave histories of removal of lower third molars one month before observation of the disease. Each case was treated by repeated drainage and aspiration, x-rays and administration of thymol crystals in 5-gm. capsules after each meal. The thymol dosage was increased 5 grains daily until, in one case, 25 grains per day was being absorbed and in the other 45 grains per day. The filtered x-ray treatment was 200 roentgen units repeated every ten days. Both cases were apparently cured in less than two months.

Ameloblastoma (Adamantinoma) of the Mandible: Report of Case

By REED O. DINGMAN

In a case of adamantinoma reported, the history is one of repeated operation before hemiresection of the mandible produced a final cure. The point emphasized is the need for early radical surgery in these tumors.

INCIDENTS OF PRACTICE

Direct Acrylic Davis Crown Technic

E. R. Blaukopf, D.D.S., South River, N. J.

It is a self-evident fact that, wherever convenience permits, a direct technic is less likely to err than an indirect method. In spite of the many improvements in impression and casting materials, the chances of error increase in proportion to the "indirectness" with which the desired end-result is attained. It is not necessary for us to review the accepted Davis crown technics. Let it suffice to say that those of us who have tried it have often met with failure, particularly because of the lack of intimate contact of the artificial crown with the root. It is difficult to grind a porcelain crown with machine-like precision and to contact with the root surface at all points. Variations of this technic have proved to have merit as well as be time consuming. However, let it be clearly understood that any technic which gives the desired result regardless of time is well worth the effort. Nevertheless, a simplified approach giving equal satisfaction is well worth the practitioner's attention.

Fig. 1.—Cuspid root prepared in manner similar to preparation of detached post crown. The proper size post is fitted into the root.

Fig. 2.—Celluloid crown form of size that will fit cervical area of root stump adapted so that it will fit snugly, like a collar, around tooth.

The following technic has been used by some with most gratifying results.

1. Prepare the root end in the usual manner, well below the gingival margin.

2. Ream out the root canal to a depth equal to the size of the crown. The longer the pin can be made, without endangering the tooth, the greater the stability.

Fig. 3.—Crown form returned after removal and filling with melted wax. While the wax is still soft, the crown form is forced over the post and cervical area of the root stump. The patient is asked to bite in occlusion and the wax is allowed to harden. If the crown form does not have the proper shape and conform esthetically with the rest of the teeth, it is permissible to add wax in any or all places necessary to give the crown proper form. The wax sticks readily to the celluloid.

3. Create a groove or slot lingually on the root stump, so that the completed crown will have a positive position on the prepared stump.

4. Select an iridium-platinum pin to fit the root canal comfortably. Undercut

the pin at several points where it will come in contact with the artificial crown.

5. Select a celluloid crown form which suits the root stump. Trim it to size and occlusion. Very often, it is possible to select a crown form which accurately fits the stump and has all the esthetic principles involved. However if necessary, the celluloid crown form need fit only the root stump. Celluloid accepts wax readily, and the operator can easily contour the crown to his own satisfaction.

Fig. 4.—Completion of crown. The crown form is removed from the stump and completed with the pin that had previously been placed in the root canal. The crown and pin are invested in the same manner as an acrylic jacket. The flasks are separated and the wax is boiled out in the usual manner. The celluloid can easily be removed when softened with a few drops of acetone. Processing is carried out in acrylic in the usual manner and the crown is polished. The advantage of this technic is that it can be carried out directly in the mouth, and an accurate fit will result between the post crown and the prepared root end.

6. After selecting a proper crown form, place the pin in the root canal, fill the crown form with liquid wax, allow the glaze to disappear and force the crown over the pin and root stump. Allow the wax to harden. Trim away the excess wax, and contour the crown with additional wax to meet the esthetic requirements of the case.

7. Remove the crown with the pin and invest as you would any acrylic crown or jacket; i.e., make a stone investment and counter investment.

8. Boil out the wax and, with a drop or two of acetone, soften the celluloid so that it is easily removable in one place.

9. Process in your favorite acrylic.

84 Main Street.

ANNOUNCEMENTS

ANNOUNCEMENTS must be received by the fifth of the month in order to be published in the forthcoming issue of THE JOURNAL.

CALENDAR OF MEETINGS

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Cleveland, Ohio, September 11-16.

AMERICAN DENTAL ASSISTANTS ASSOCIATION, October 16-18.

AMERICAN DENTAL ASSOCIATION, Chicago, Ill., October 16-18.

AMERICAN DENTAL HYGIENISTS' ASSOCIATION, October 16-18.

AMERICAN DIETETIC ASSOCIATION, Chicago, October 16-18.

AMERICAN PUBLIC HEALTH ASSOCIATION, New York, N. Y., October 3-5.

AMERICAN SOCIETY FOR THE ADVANCEMENT OF GENERAL ANESTHESIA IN DENTISTRY, New York, N. Y., October 23.

AMERICAN SOCIETY FOR ORAL SURGEONS, Chicago, Ill., October 12-14.

UNIVERSITY OF BUFFALO DENTAL ALUMNI ASSOCIATION, Buffalo, October 17-19.

DISTRICT OF COLUMBIA DENTAL SOCIETY, second Tuesday in each month, at the Medical Society Auditorium, Washington.

GREAT LAKES SOCIETY OF ORTHODONTISTS, Toledo, Ohio, October 23-24.

MID-CONTINENT DENTAL CONGRESS, St. Louis, Mo., October 30-November 1.

MID-CONTINENT DENTAL COUNCIL, St. Louis, Mo., October 30-November 1.

MONTREAL DENTAL CLUB ANNUAL FALL CLINIC, October 25-27.

GREATER NEW YORK DENTAL MEETING, December 4-8.

NEW YORK INSTITUTE OF CLINICAL ORAL PATHOLOGY, New York, N. Y., October 30.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA, Pittsburgh, October 17-19.

NEW YORK SOCIETY OF ORTHODONTISTS, New York, November 13-14.

PAST PRESIDENTS' CLUB, Chicago, Ill., October 17.

WOMEN'S DENTAL SOCIETY OF NEW YORK, New York, N. Y., September 20 and November 15.

STATE SOCIETIES

September

Southern California, at Los Angeles (19-21)

March 1945

Wisconsin (19-21)

April 1945

Oklahoma, at Oklahoma City (15-18)

May 1945

Massachusetts, at Boston (14-17)

STATE BOARDS OF DENTAL EXAMINERS

Alabama, at Birmingham, September 25. Farrar McCrummen, Woodward Bldg., Birmingham, Secretary.

Arizona, at Phoenix, October 9. R. K. Trueblood, 25 N. Second Ave., Glendale, Secretary.

Florida, at Jacksonville, September 18-21. A. W. Kellner, P. O. Box 155, Hollywood, Secretary.

Indiana, at Indianapolis, December 11-14. C. A. Frech, 504 Broadway, Gary, Secretary.

Kentucky, at Louisville, September 12-15. W. F. Walz, 1114 First Nat'l Bank Bldg., Lexington 3, Secretary.

Maine, at Augusta, October 2-4. Carl W. Maxfield, 31 Central St., Bangor, Secretary.

Nebraska, at Omaha, September 25-28. Oscar F. Humble, Director.

New Jersey, October 2-5. J. Frank Burke, 150 E. State St., Trenton, Acting Secretary.

North Carolina, at Raleigh, September 25. Wilbert Jackson, Rich Bldg., Clinton, Secretary.

Ohio, at Cleveland, September 11-13, or Columbus, October 9-11 (practical examination for dental candidates); at Columbus, October 12-14 (theory examinations for dental and dental hygiene candidates); at Columbus, October 10 (practical examination for dental hygiene candidates). Earl D. Lowry, 79 E. State St., Columbus, Secretary.

Pennsylvania, at Philadelphia and Pittsburgh, September 25-30. Reuben E. V. Miller, 61 N. Third St., Easton, Secretary.

South Carolina, at Columbia, October 2-4. T. C. Sparks, 1508 Washington St., Columbia 23, Secretary.

Tennessee, at Memphis, September 12-16. Russell L. Moore, Dyersburg, Secretary.

Texas, at Houston, September 12-15. R. T. Weber, 311 Norwood Bldg., Austin 16, Secretary.

Virginia, at Richmond, October 24. John M. Hughes, Medical Arts Bldg., Richmond, Secretary.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE American Association for the Advancement of Science will meet in Cleveland, Ohio, September 11-16. The Dental Subsection of the association will present a symposium on dental caries and fluorine September 11.

PAUL C. KITCHIN, *Secretary,*
Subsection on Dentistry,
Ohio State University,
College of Dentistry.

AMERICAN ASSOCIATION OF ENDODONTISTS

THE objects of the American Association of Endodontists are (1) to promote the interchange of ideas on methods of pulp conservation and root-canal treatment; (2) to promote research studies, both clinical and laboratory, among its members; (3) to assist in establishing local root-canal study clubs, and (4) to help maintain a high standard of root-canal practice within the dental profession by disseminating information through lectures, clinics, publications, etc. Although it is not the object of the organization to promote root-canal therapy as a specialty of dentistry, specialization in this field by any of its members will not be discouraged. Those interested may apply for an application for membership to

LOUIS I. GROSSMAN, *Secretary,*
4001 Spruce St.,
Philadelphia 4, Pa.

AMERICAN DENTAL ASSISTANTS ASSOCIATION

THE twentieth annual session of the American Dental Assistants Association will be held in Chicago, October 16-18, at the La-Salle Hotel.

AILEEN M. FERGUSON,
General Secretary,
709 Centre St.
Jamaica Plain 30, Mass.

AMERICAN DENTAL ASSOCIATION

The next meeting of the House of Delegates of the American Dental Association will be held in Chicago, Ill., October 16-18.

HARRY B. PINNEY, *Secretary,*
222 East Superior St.,
Chicago 11, Ill.

AMERICAN DENTAL HYGIENISTS' ASSOCIATION

THE twentieth annual meeting of the House of Delegates and Board of Trustees of the American Dental Hygienists' Association will be held in Chicago, October 16-18, with headquarters at the Stevens Hotel.

A. REBEKAH FISK, *Secretary,*
1704 N. Troy St.
Arlington, Va.

AMERICAN DIETETIC ASSOCIATION

THE annual meeting of the American Dietetic Association will be held at the Palmer House, Chicago, Ill., October 25-27. The sessions will be devoted to discussion of plans and problems relating to food and nutrition in connection with the war. Topics will include progress of the acceleration program to increase the number of qualified dietitians; improvement in methods in teaching student nurses; recruitment of dietitians for the Army; administrative food problems; newer developments in diet therapy; maternal and child nutrition; school lunch problems; rationing and food supplies; labor policies in food service units, and technology of foods. Details will be released as they develop.

AMERICAN PUBLIC HEALTH ASSOCIATION

THE Executive Board of the American Public Health Association announces the Second Wartime Public Health Conference and the seventy-third annual business meeting in New York, N. Y., October 3-5. Meetings of related organizations will take place October 2. Headquarters, Hotel Pennsyl-

vania. The scientific program will be devoted to wartime emergency matters as they affect public health. The chairman of the Local Committee in Charge of Arrangements is Ernest L. Stebbins, M.D., health commissioner of New York City. The chairman of the program committee is Reginald M. Atwater, M.D.

WILLIMINA RAYNE WALSH,
Associate Secretary,
1730 Broadway,
New York 19, N. Y.

AMERICAN SOCIETY FOR THE ADVANCEMENT OF GENERAL ANESTHESIA IN DENTISTRY

THE fall meeting of the American Society for the Advancement of General Anesthesia in Dentistry will be held October 23 at the Hotel McAlpin, New York. George F. Seeman, president, of Nashville, Tenn., will preside. Dinner will be served at 7 p.m. at the McAlpin, with the scientific session at 8:30. M. Hillel Feldman, New York, will speak on the every-day problems in the field of general anesthesia in dental surgery. Members of the profession are invited.

M. HILLEL FELDMAN, *Secretary,*
730 Fifth Ave.,
New York, N. Y.

AMERICAN SOCIETY OF ORAL SURGEONS

THE twenty-sixth annual meeting of the American Society of Oral Surgeons will be held in Chicago, October 12-14.

HARRY BEAR, *Secretary,*
410 Professional Bldg.
Richmond, Va.

UNIVERSITY OF BUFFALO DENTAL ALUMNI ASSOCIATION

THE forty-third annual meeting of the University of Buffalo Dental Alumni Association will be held October 17-19 at the Hotel Statler, Buffalo. The Eighth District Dental Society of the State of New York is cooperating in preparation of the program. Members of the profession are invited.

EDGAR L. RUFFING, *Chairman,*
Press & Publications,
233 West Ferry St.,
Buffalo.

DISTRICT OF COLUMBIA DENTAL SOCIETY

THE District of Columbia Dental Society holds its meetings on the second Tuesday of every month, at the Medical Society Auditorium, 1718 M. St., N.W., Washington.

J. WALTER BERNHARD, *Secretary,*
1835 Eye St., N.W.,
Washington.

GREAT LAKES SOCIETY OF ORTHODONTISTS

THE next meeting of the Great Lakes Society of Orthodontists will be held October 23-24 at the Commodore Perry Hotel, Toledo, Ohio.

C. EDWARD MARTINEK, *Secretary,*
661 Fisher Bldg.,
Rochester, N. Y.

MID-CONTINENT DENTAL CONGRESS

THE annual Mid-Continent Dental Congress, sponsored by the St. Louis Dental Society, will be held at the Hotel Jefferson, October 30-November 1.

HENRY F. WESTHOFF, *Chairman,*
Publicity Committee,
Missouri Theater Bldg.,
St. Louis, Mo.

MID-CONTINENT DENTAL COUNCIL

A SPECIAL invitation to attend the Mid-Continent Dental Council at St. Louis October 30-November 1 is extended to those dentists serving in the armed forces who are at this time stationed in the United States. Those planning to attend are requested to contact Capt. K. C. Marshall, O'Reilly General Hospital, Springfield, Mo., so that suitable arrangements may be made.

RALPH B. RODE, *President.*

TWENTIETH ANNIVERSARY—MONTREAL FALL CLINIC

THE program for the 20th anniversary meeting, which will be held on October 25, 26 and 27 is rapidly taking form, and at this point would appear to be well up to the standard set by previous meetings. Among the clinicians appearing on the program will be: R. O. Dingman, Ann Arbor, Mich., "Oral Surgery"; E. R. Granger, Mount Vernon, N. Y., "Oral Diagnosis"; R. D. Sommer, Ann Arbor, Mich., "Root

Canal Therapy"; S. A. MacGregor, Toronto, Ontario, "Children's Dentistry."

It is anticipated that several clinicians and essayists from the Canadian Dental Corps will also participate in the program, through the courtesy of Brig. F. M. Lott, Director General of Dental Service. Further details of the program will appear in the near future.

Table clinics, group clinics, educational films and a large and diversified commercial exhibit will round out the program.

Any dentist, in good standing, who is not on the mailing list of the Montreal Dental Club and who wishes to obtain further particulars on this meeting should forward his name and address to the chairman.

M. L. DONIGAN,
1414 Drummond Street,
Montreal, Canada.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA

The Odontological Society of Western Pennsylvania will hold its annual meeting at the William Penn Hotel, Pittsburgh, October 17-19.

W. EARLE CRAIG, *Secretary*,
Suite 206, Jenkins Bldg.,
Pittsburgh 22.

GREATER NEW YORK DENTAL MEETING

THE twentieth annual Greater New York Dental Meeting will be held December 4-8, at the Hotel Pennsylvania, New York City. Comprising the program are twenty-four morning registered clinics, twenty afternoon registered clinics, forty-five table clinics and thirty topic discussions; with thirty-two speakers, seven on medical-dental subjects, and twenty-six visual education films. The dental manufacturers, supply houses and laboratories will have exhibits of the newest materials and equipment available. Programs will be available in early November. Dentists in attendance should bring with them their A.D.A. membership cards to avoid confusion in registering.

NEW YORK SOCIETY OF ORTHODONTISTS

THE next meeting of the New York Society of Orthodontists will be held at the Waldorf-Astoria Hotel, New York, November 13-14.

NORMAN L. HILLYER, *Secretary*,
Professional Bldg.,
Hempstead.

NEW YORK INSTITUTE OF CLINICAL ORAL PATHOLOGY, INC.

THE first open meeting of the New York Institute of Clinical Oral Pathology will be held in Hosack Hall, New York Academy of Medicine, New York City, October 30 at 8:15 p.m. Arthur H. Merritt will preside at a symposium on "Fluorine in Dental Public Health," in which the following will participate: Frederick S. McKay, Colorado Springs, Colo.: "Fluorine and Mottled Enamel: A Historical Survey." H. Trendley Dean, senior dental surgeon, U.S.P.H.S., Bethesda, Md.; "Epidemiology of Fluorosis and Dental Caries." Wallace D. Armstrong, associate professor of physiologic chemistry and director of laboratory of dental research, University of Minnesota, Minneapolis: "The Fluorine Content of Enamel in Relation to Resistance of Teeth to Caries." Basil G. Bibby, dean of Tufts Dental College: "Effects of Topical Application of Fluorides in Dental Carries." David B. Ast, assistant director for oral hygiene, State of New York Department of Health, Division of Maternity, Infancy and Child Hygiene: "Practicability, Efficacy and Safety of Fluorinating a Common Water Supply Deficient in Fluorine to Control Dental Carries."

For further information, address

G. ROISTACHER, *Executive Secretary*,
101 E. 79th St.,
New York 21, N. Y.

PAST PRESIDENTS' LUNCHEON, A. D. A.

THE Past Presidents' Club of the American Dental Association will hold its annual luncheon at 12:30, Tuesday, October 17 at the Stevens Hotel, Chicago. The annual address will be delivered by Arthur C. Wherry, with Wilfred H. Robinson presiding. Every Past President is urgently requested to join with his colleagues, who, like himself, have contributed of time and effort in developing the various activities of the Association to their present recognized importance as an integral and essential phase

of health service in civilian and military life.

HOMER C. BROWN, *Secretary,*
1816 Franklin Ave.
Columbus 9, Ohio.

WOMEN'S DENTAL SOCIETY OF NEW YORK

THE next meeting of the Women's Dental Society of New York will be held September 20 at the Pennsylvania Hotel at 8 p.m. Carlton Frederichs will speak on "Victuals, Vitamins and Victory."

MATHILDE FREUND, *Chairman,*
Publicity Committee,
Scarsdale.

SOUTHERN CALIFORNIA STATE DENTAL ASSOCIATION

THE annual meeting of the Southern California State Dental Association will be held at the Biltmore Hotel, Los Angeles, September 19-21.

ROBERT L. BORLAND, *Secretary,*
1052 W. 6th St.,
Los Angeles 14.

MASSACHUSETTS DENTAL SOCIETY

THE 1945 meeting of the Massachusetts Dental Society will be held at the Statler Hotel, Boston, May 14-17.

P. E. ADAMS.

OKLAHOMA STATE DENTAL SOCIETY

THE Oklahoma State Dental Society will hold its 1945 meeting in Oklahoma City April 15-18.

E. W. WISE, *Secretary.*

WISCONSIN STATE DENTAL SOCIETY

THE 1945 meeting of the Wisconsin State Dental Society, the Diamond Jubilee, will be held March 19-21, 1945.

BOARD OF DENTAL EXAMINERS OF ALABAMA

THE Board of Dental Examiners of Alabama will conduct its next dental examination beginning September 25 at Birmingham. Credentials and fees must be in the hands of the secretary two weeks in advance of the examination. For application blanks and further information, address

FARRAR MCCRUMMEN, *Secretary,*
1005-1006 Woodward Bldg.,
Birmingham.

ARIZONA STATE DENTAL BOARD

THE next examinations to be conducted by the Arizona State Dental Board will be held in Phoenix commencing October 9. All credentials must be in the office of the secretary by September 25. Address all communications to

R. K. TRUEBLOOD, *Secretary,*
25 N. Second Ave.,
Glendale.

FLORIDA STATE BOARD OF DENTAL EXAMINERS

THE Florida State Board of Dental Examiners will hold its next examination of applicants for license to practice dentistry or dental hygiene in Florida at Jacksonville in the Seminole Hotel, September 18-21. Dental candidates must file preliminary applications by July 18. Final applications for dental and dental hygiene candidates must be complete by August 18. Address all communications to

A. W. KELLNER, *Secretary,*
P. O. Box 155,
Hollywood.

INDIANA STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the Indiana State Board of Dental Examiners will be held in Indianapolis, December 11-14. All applications must be in the hands of the secretary at least two weeks prior to the date of examination. For applications or information, address

C. A. FRECH, *Secretary,*
504 Broadway
Gary.

KENTUCKY STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the Kentucky State Board of Dental Examiners will be held September 12-15 at the University of Louisville Dental School, Louisville. Dentists graduated prior to 1944 must file applications, complete with full information requested, at this office not later than July 12. Applications of 1944 graduates must be in this office by August 12. Dental hygienists must have completed a two-year course and their applications must be filed before Aug-

ust 12. For application forms and further information, address

W. F. WALZ, *Secretary,*
1114 First Nat'l Bank Bldg.,
Lexington 3.

MAINE STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the State Board of Dental Examiners of Maine will be held in the State House, Augusta, October 2-4. Applications with necessary fee must be in the hands of the secretary at least ten days before the date of the examination. Address all communications to

CARL W. MAXFIELD, *Secretary,*
31 Central St.
Bangor.

STATE OF NEBRASKA BUREAU OF EXAMINING BOARDS

THE next dental examination in the State of Nebraska will be given September 25-28 at Creighton University College of Dentistry, Omaha. Applications for this examination must be filed with the office of the Bureau of Examining Boards, Room 1009, State Capitol Bldg., Lincoln, at least fifteen days before the first day of the examination.

OSCAR F. HUMBLE, *Director.*

STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY OF NEW JERSEY

THE State Board of Registration and Examination in Dentistry of New Jersey will hold its next regular examinations commencing October 2 and continuing for three days. A copy of the requirements and rules, instruction sheet and preliminary application will be sent upon request to the secretary. Candidates must file the preliminary application blank, together with the examination fee of $25, on or before September 1. Future schedules will be announced.

J. FRANK BURKE, *Acting Secretary,*
150 E. State St.,
Trenton 8.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the North Carolina State Board of Dental Examiners for the examination of applicants for licensure will be held at the State Capitol, Raleigh, beginning September 25. Applications must be filed with the secretary thirty days before the examination. For application blanks and further information, address,

WILBERT JACKSON, *Secretary,*
Rich Bldg.,
Clinton.

OHIO STATE DENTAL BOARD

THE practical examination of the Ohio State Dental Board will be held at Western Reserve University School of Dentistry, Cleveland, September 11-13 and at Ohio State University College of Dentistry, Columbus, October 9-11. The practical examination may be taken either in Cleveland or in Columbus provided due notice is given to the secretary. The practical examination for dental hygiene candidates will be held October 10 at Ohio State University College of Dentistry, Columbus. The theory examination for both dental and dental hygiene applications will be held in Columbus, October 12-14. All applications for these examinations must be in the hands of the secretary not later than September 28 and no application will be accepted after that date. For further information, apply to

EARL D. LOWRY, *Secretary,*
79 E. State St.,
Columbus.

DENTAL COUNCIL AND EXAMINING BOARD OF THE COMMONWEALTH OF PENNSYLVANIA

THE Dental Council and Examining Board of the Commonwealth of Pennsylvania will meet in Philadelphia and Pittsburgh September 25-30 to examine applicants for licensure to practice dentistry. For further information and application blanks, address the Department of Public Instruction, Bureau of Professional Licensing, Dental Division, Harrisburg.

REUBEN E. V. MILLER, *Secretary,*
61 N. Third St.,
Easton.

SOUTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

THE South Carolina State Board of Dental Examiners will hold its next meeting in Columbia, October 2-4. All applications must be filled out and returned to the secre-

tary at least thirty days before the date on which the examinations are to begin.

T. C. SPARKS, *Secretary.*
1508 Washington St.,
Columbia 23.

TENNESSEE BOARD OF DENTAL EXAMINERS

THE Tennessee Board of Dental Examiners will hold its next examination September 12-16, at the University of Tennessee, College of Dentistry, Memphis, for licensure in dentistry or oral hygiene. Applications must be in the hands of the secretary at least thirty days before the date of the examination. For further information and applications, address

RUSSELL L. MOORE, *Secretary,*
Dyersburg.

TEXAS STATE BOARD OF DENTAL EXAMINERS

THE next examination of the Texas State Board of Dental Examiners will be held in Houston, September 12-15, with headquarters in the Rice Hotel. The board has adopted a new form of application blank, now available on application to the secretary. One of the new requirements will be a photostatic copy of the candidate's birth certificate, to be attached to the application. This will establish citizenship. If the applicant has been naturalized, he will have to submit pertinent information giving the number of the certificate, the court and the date, at the time he applies, and present his original papers at the meeting of the board. These forms must be in the hands of the executive secretary at least thirty days before the examination.

R. T. WEBER, *Secretary,*
311 Norwood Bldg.,
Austin 16.

VIRGINIA STATE BOARD OF DENTAL EXAMINERS

THE next regular meeting of the Virginia State Board of Dental Examiners will be held at the Medical College of Virginia, Richmond, beginning at 9 a.m., October 24, instead of September 19 as formerly announced. No applications will be accepted after October 7. Incomplete applications will be declined and returned. For application blanks and further information, apply to

JOHN M. HUGHES, *Secretary,*
715 Medical Arts Bldg.,
Richmond.

ALPHA OMEGA

ALL Massachusetts members of Alpha Omega in service, both in this country and abroad, are requested to communicate with Abraham Gurvitz, War Service Committee, Alpha Omega Fraternity, 371 Commonwealth Ave., Boston 15, Mass.

SAMUEL S. HIRSON, *Secretary,*
Boston Alumni Chapter,
471 Commonwealth Ave.,
Boston, Mass.

INTERNSHIP AND VOLUNTEER EXTERNSHIPS

THERE is an internship, as well as several volunteer externships, available for recent graduates in the Dental Department of the Bronx Hospital. Opportunity is offered for training and experience in oral surgery and exodontia, orthodontia, periodontia, endodontia (root-canal therapy) and operative dentistry. Application forms can be obtained by communicating with S. Berton Gerstner, Director, Dental Department, Bronx Hospital, Fulton Ave. at 169th St., Bronx 56, N. Y.

DENTAL INTERNSHIPS

Two internships are available at the St. Louis City Hospital for recent dental graduates. Opportunity is afforded for training and experience in dental and oral surgery, diagnosis and other phases of dentistry. Applicants should address Leo J. Wade, Medical Director, or Hamilton B. G. Robinson. D.D.S., City Hospital, 1515 Lafayette Ave., St. Louis, Mo.

DENTAL INTERNSHIPS

THE Greater New York Conference of Hospital Dental Services, comprised of a group of men who are chiefs of dental services, would like to aid those men seeking dental internships in hospitals in the metropolitan area. Those who are not in the Army or the Navy and who are desirous of obtaining internships should communicate with

MARY E. REILLY, *Secretary,*
386 Fourth Ave.,
New York, N. Y.

DENTAL INTERNSHIPS

AN internship is available to a recent dental graduate at the Research and Educational Hospital of the University of Illinois Medical Center. An unusual opportunity is afforded for training and experience in hospital dentistry and the medical aspects of dental diseases. Application forms can be obtained from the Dean, University of Illinois College of Dentistry, 808 South Wood St., Chicago 12, Ill.

CARNEGIE FELLOWSHIPS FOR RESEARCH AND GRADUATE WORK IN THE DENTAL SCIENCES

AIDED by the Carnegie Corporation of the New York and the Eastman Dental Clinic, the School of Medicine and Dentistry of the University of Rochester offers scholarships paying $1,200-$1,800 per annum to well-trained dental graduates who are interested in research or who desire special training in the basic medical sciences as an aid in dental teaching or practice. A few fellowships also offer part-time training in oral surgery. On appointment, the applicant is given the title of Fellow in Dentistry and, according to his interests, works as a graduate student in one of the departments of the medical schools. Here, excellent laboratory facilities, adequate direction and close contact with various investigations related to medicine and dentistry help his research and study. Fellows are encouraged to attend medical classes, seminars and staff meetings and, when opportunity presents itself, to participate in class instruction and scientific meetings. Contact with the problems of clinical dentistry may be maintained through the Oral Surgery Clinic of the Strong Memorial Hospital and the Rochester Dental Dispensary. With the approval of the Graduate Council of the university, Fellows may prepare themselves for the degree of M.S. or Ph.D. Applications should be made to

GEORGE H. WHIPPLE, *Dean,*
Rochester, N. Y.

FEDERAL POSITIONS FOR DENTAL HYGIENISTS

THE United States Civil Service Commission is continuing to recruit dental hygienists for federal positions. Experience is no longer necessary.

Completion of a full course leading to graduation from a recognized school of oral hygiene and registration as a dental or oral hygienist in a state, territory or the District of Columbia will qualify applicants.

Students enrolled in schools of oral hygiene may apply for federal positions when they are within nine months of completion of the course and may enter on duty on completion and registration. There are no age limits for the positions and no written tests. Appointees receive $1,970 a year entrance salary, which incorporates compensation for the eight hours of overtime included in the present forty-eight hour federal work week. The majority of postions are in Army hospitals and dispensaries throughout the country, particularly in the West and Southwest. Vacancies may occur also in the Veterans Administration and the Public Health Service. Applications should be filed with the Civil Service Commission, Washington 25, D. C.

W. C. HULL, *Executive Assistant,*
United States Civil Service Commission,
Washington, D. C.

POSTGRADUATE COURSE IN ROENTGENOLOGY

THE College of Dentistry of Ohio State University offers an additional postgraduate course in roentgenology, beginning September 25-29.

WENDELL D. POSTLE, *Dean,*
Columbus 10, Ohio.

DENTAL HYGIENE COURSE

A NEW course will be offered for dental hygienists at Ohio State University, beginning with the autumn quarter, October 3. The requirements for admission are the same as for admission to the College of Arts and Science. This is a two year course, leading to a certificate of graduate dental hygienist. The fee is $50 per quarter.

WENDELL D. POSTLE, *Dean,*
Columbus 10, Ohio.

CHICAGO DENTAL SOCIETY FOURTH ANNUAL PRIZE ESSAY COMPETITION

To encourage continued scientific research in all phases of dentistry, the Chicago Dental Society again offers a cash prize of $500 to the author of the most meritorious essay reporting an original investigation and containing new and significant material of value to dentistry.

The winner of the award will be invited to present his essay at the eighty-first Midwinter Meeting of the Chicago Dental Society, to be held in Chicago during February 1945. The expense of the winner will be paid by the society and will be in addition to the prize of $500.

Any member of the American Dental Association or of a recognized foreign dental society, or any one affiliated with a recognized institution in the dental field may apply for authorization to enter the competition. The contest is not limited to research men having technical staffs and elaborate equipment at their disposal, but is open to any qualified person who believes that he has something new and important to contribute to dentistry. The rules are simple and fair and all contestants, whether students, teachers or practitioners, have an equal opportunity.

Application forms and contest rules can be obtained by writing to the Chicago Dental Society, 30 N. Michigan Ave., Chicago 2, Ill. All applications must be filed in the office of the society by October 2, 1944.

EXAMINATION FOR APPOINTMENT IN THE DENTAL CORPS, REGULAR NAVY

THE next examination for appointment as Assistant Dental Surgeon, U. S. Navy (lieutenant, junior grade, Dental Corps, U. S. Navy) will be held at the Naval Training Station, Norfolk, Va., the Naval Training Center, Great Lakes, Ill., the Naval Training Center, San Diego, Calif., and the Naval Dental School, National Naval Medical Center, Bethesda, Md., October 16. Application for this examination should be made to the chief of the Bureau of Medicine and Surgery, Navy Department, Washington, D. C. Applicants for appointment as Assistant Dental Surgeon must be citizens of the United States, more than 21, but less than 32 years of age at the time of acceptance of appointment and graduates of a class A dental school. A circular of information listing physical and other requirements for appointment, subjects in which applicants are examined and other data pertaining to salary, allowances, etc., can be obtained from the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., on request.

UNITED STATES PATENTS APPLICABLE TO DENTISTRY ISSUED DURING MAY AND JUNE 1944

May 2

2,347,741, HERBERT LESLIE HOBDAY and NORMAN GEORGE BROWN. Dental chuck.

2,347,859, LOUISE N. WILLIAMS. Adjustable headrest.

D-137,808, SAMUEL GALPER. Design for a rack for supporting hypodermic needles in card form.

May 9

2,348,337, EARL HENRY FRANCIS. Hypodermic projectile.

2,348,471, CHARLES HALLER. Denture clamp.

2,348,606, EDMUND J. CAYO. Method and apparatus for making artificial dentures.

May 16

2,348,961, FRANK MOORE COWPER. Clamping means.

May 23

2,349,607, HERBERT R. BERGER. Dental instrument.

May 30

2,350,196, JACOB A. SAFFIR. Artificial teeth.

June 6

2,350,518, EARL MORRISON. Compressor.

2,350,864, FRED T. BALDWIN. Dental Flask.

June 13

No Dental Patents Issued.

June 20

2,351,943, MEINOLF EBBERS. Dental Unit.
ADOLF HELBIG.
HANS MEWES.

June 27

No Dental Patents Issued.